AFWAL-TR-85-4096

CONSTANT-LOAD-AMPLITUDE FATIGUE CRACK GROWTH TESTING OF CAST ALUMINUM ALLOYS A201-T7 AND A357-T6

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November 1985

Final Report for Period March 1983 - April 1984

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ADA 163494

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION: Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT: Approved for public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S): AFWAL-TR-85-4096	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION: AFWAL Materials Laboratory; 6b. OFFICE SYMBOL (If applicable): AFWAL/MLSA	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State and ZIP Code): AFWAL/MLSA, Wright Patterson AFB, OH 45433-6533	7b. ADDRESS (City, State and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION; 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State and ZIP Code)	10. SOURCE OF FUNDING NOS.

PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT NO
62102F	2418	241807	24180703

11 TITLE (Include Security Classification): See Block 16	
12. PERSONAL AUTHOR(S): J.D. Tirpak, 1Lt, USAF	
13a. TYPE OF REPORT: Final; 13b. TIME COVERED: FROM March 83 TO April 84	14. DATE OF REPORT (Yr., Mo., Day): 1985 November; 15. PAGE COUNT: 60
16. SUPPLEMENTARY NOTATION: Constant-Load-Amplitude Fatigue Crack Growth Testing of Cast Aluminum Alloys A201-T7 and A357-T6, Unclassified	

17. COSATI CODES		
FIELD	GROUP	SUB. GR.
11	06	

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
Constant Amplitude Fatigue Crack Growth A201-T7
Cast Aluminum Alloys A357-T6

19. ABSTRACT (Continue on reverse if necessary and identify by block number) 0000001

This report is a repository of constant-load-amplitude fatigue crack growth rate data for cast aluminum alloys A201-T7 and A357-T6. Conditions were R=0.1, room temperature, lab air, and growth rates were above ~~10^{-8}~~ m/cycle.

Cont'd pg. 57

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT: UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS ☐	21. ABSTRACT SECURITY CLASSIFICATION: Unclassified

22a. NAME OF RESPONSIBLE INDIVIDUAL	22b TELEPHONE NUMBER (Include Area Code)	22c OFFICE SYMBOL
J.D. Tirpak, 1Lt, USAF	513-255-5108	AFWAL/MLSA

DD FORM 1473, 83 APR EDITION OF 1 JAN 73 IS OBSOLETE

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

PREFACE

This report was prepared by the Materials Integrity Branch (AFWAL/MLSE), Systems Support Division, Materials Laboratory, Air Force Wright Aeronautical Laboratories, Wright Patterson Air Force Base, Ohio, under Project 2418, "Aerospace Structural Materials," Task 241807, "Systems Support," Work Unit 24180703, "Engineering and Design Data."

The work herein was performed during the period March 1983-April 1984. The final report was released in July 1985.

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SECTION I

BACKGROUND

The Air Force has sponsored several programs to advance and apply premium quality aluminum castings to airframe structure. The main objective for exploiting aluminum foundry technology is to drive down system acquisition costs. Replacing multi-component built-up structures with monolithic cast structures reduces, or eliminates altogether, machining, fasteners and component assembly and their associated costs. Typically aluminum castings can cut structural component acquisition costs by at least 25%.

While premium quality aluminum casting technology matured through industry and government supported efforts, the Air Force also developed and applied durability and damage tolerant design philosophies to airframes. For both philosophies, a substantial amount of engineering design data is required, especially fatigue crack growth data.

Since aluminum castings were not used in primary fracture critical structure, little fatigue crack growth data was generated for these alloys. Now that there is interest in applying aluminum castings in fracture critical primary structure, programs have been developed to address the issues which currently limit castings to secondary structure. For the most part, this report serves as a repository for some fatigue crack growth data of two commonly used aluminum casting alloys; A201-T7 and A357-T6.

SECTION II

TEST PROGRAM AND PROCEDURES

A. MATERIAL A201 and A357 were the two casting alloys used in this program. A201 is a heat-treatable aluminum-copper-silver alloy which has relatively high mechanical properties in the T7 condition (60 ksi UTS, 55 ksi YTS, 5% elongation). A357 is a heat-treatable aluminum-silicon-magnesium alloy which has moderate properties in the T6 condition (50 ksi UTS, 40 ksi YTS, 5% elongation). The alloy chemistry limits are listed in Table I. One A357 specimen, 89CGI, was low on silicon.

The specimens in this program were machined from test plates which met all Mil-A-21180C requirements.

B. TEST SPECIMEN The test specimens used for this program were standard compact-type (CT) specimens measuring about 0.375 inches thick (B) and 2.000 inches wide (W), (Figure 1). Actual measurements for each specimen are given in the Appendix.

C. TEST PROCEDURES Tests were conducted in accordance with ASTM Standard E647, "Standard Method for Constant-Load-Amplitude Fatigue Crack Growth Rates Above 10^{-8}m/cycle."

The A201 specimens were precracked and tested on a 25 kip electrohydraulic axial fatigue machine. Crack length was measured optically using a travelling microscope.

The A357 specimens were precracked and tested on a 2.2 kip electrohydraulic axial fatigue machine. Crack lengths were measured either manually, using the travelling microscope, or automatically,

using a constant current foil crack gage bonded to the specimen.

For both alloys, an R ratio of 0.1 was applied. Two frequencies were used, 25 and 30 hertz.

All tests were conducted at room temperature in lab air.

Crack growth rates, da/dn verses ΔK, were generated using the seven-point polynomial method.

SECTION III

RESULTS AND DISCUSSION

The a verses N data and the crack growth rate data were tabulated and plotted for each specimen in the Appendix.

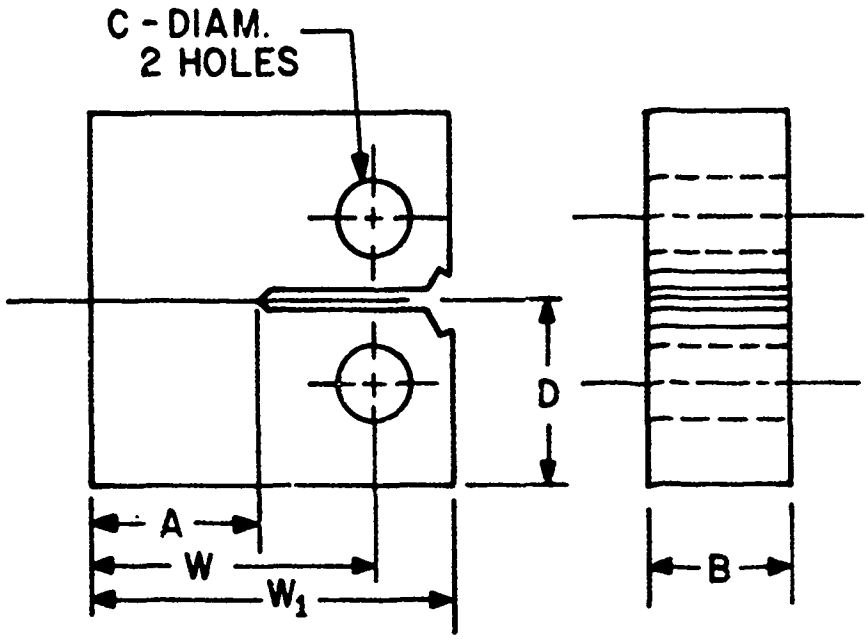
The five A201-T7 specimens exhibited some scatter and periods of reversals of growth rate. This was possibly due to the interruption of (manual) testing for crack length measurements and the variability of the material from specimen to specimen. Also, it was noted that the fatigue crack followed a tortuous route and branched regularly. Overall, the A201-T7 data was similar to MIL-HDBK-5D data for 2124-T851 wrought plate. This was expected since the alloys are of the same alloy system.

The A357-T6 data also exhibited some scatter, but the scatter was attributed exclusively to the variability of the material and not the test procedures. The low silicon specimen data was within the scatter of all of the data.

SECTION IV

CONCLUSION

The data herein was published for use by the aerospace community. From this data, it appears as if cast aluminum alloys possess some variability with respect to fatigue crack growth rate. For the most part though, the data is to serve as a nucleus for evaluating fatigue and fracture data for aluminum casting alloys, and generating impetus for further evaluation of these alloys with respect to fracture.



B	A	W	W1	D	C
0.50 (12.7)	1.50 (38.1)	2.000 (50.8)	2.500 (63.5)	1.20 (30.50)	0.50 (12.7)

DIMENSIONS IN INCHES (mm)

Figure 1: Compact Type Specimen

	A201	A357
Copper	4.5-5.0	0.2 max
Silver	0.5-1.0	-----
Magnesium	0.25-0.35	0.55-0.65
Titanium	0.15-0.30	0.10-0.20
Iron	0.05 max	0.20 max
Silicon	0.10 max	6.5-7.5*
Beryllium	-----	0.04-0.07
Zinc	-----	0.10 max
Aluminum	balance	balance

Table I: Chemistry limits for A201 and A357 by weight percent.
*Specimen 89CC1 Low Silicon had silicon lower than the acceptable range.

APPENDIX FOR A201-T7 AND A357-T6 DATA

NOTES:

1. Pmax = Maximum load applied

   Pmin = Minimum load applied

   R = Pmin/Pmax

   B = Specimen thickness

   W = Specimen width

   Crack Correction = Distance from center of specimen pin loading holes to starter notch. For automated tests the crack correction was 0.000 inches.

   Obs # = Observation number either manual or automatic

   Cycle Count = Number of cycles in thousands

   a-measured = Uncorrected crack length measured

   Pt # = Corresponds to Obs #

   Cycle Count = Cycle count above

   A-corr = Corrected crack length

   A-reg = The crack length approximated using the seven point polynomial method

   mc = Measure of fit of A-reg to A-corr

   delta K = Calculated range of stress intensity

   da/dn = Crack growth rate in micro inches/cycle

2. Data from specimens 15CG1, 36CG1, 97CG1, and 251/4-31 were massaged (several points were deleted) to permit generating a smoother plot.

SPECIMEN NO. A201-77, 103

Pmax = 500 LBF Pmin = 50 LBF R = 0.100

B=0.374 in. W=2.002 in. Crack Correction =0.400 in.

Obs. #	Cycle Count	a-measured
1.000	50.000	0.102
2.000	100.000	0.118
3.000	150.000	0.140
4.000	190.000	0.161
5.000	216.000	0.170
6.000	240.000	0.180
7.000	264.000	0.189
8.000	288.000	0.200
9.000	312.000	0.216
10.000	332.000	0.230
11.000	348.000	0.241
12.000	378.000	0.252
13.000	394.000	0.263
14.000	408.000	0.272
15.000	422.000	0.283
16.000	436.000	0.298
17.000	454.000	0.307
18.000	468.000	0.318
19.000	482.000	0.327
20.000	496.000	0.337
21.000	512.000	0.353
22.000	527.000	0.372
23.000	538.000	0.384
24.000	550.000	0.397
25.000	560.000	0.410
26.000	568.000	0.419
27.000	578.000	0.434
28.000	586.500	0.449
29.000	595.000	0.465
30.000	603.000	0.476
31.000	611.000	0.489
32.000	619.000	0.506
1.000	6.000	0.521
2.000	11.800	0.536
3.000	17.200	0.548
4.000	22.600	0.557
5.000	28.000	0.567
6.000	37.000	0.576
7.000	42.000	0.587
8.000	46.900	0.598
9.000	51.800	0.613
10.000	56.500	0.625
11.000	61.100	0.642
12.000	65.500	0.653
13.000	69.900	0.673
14.000	74.100	0.686
15.000	78.200	0.698
16.000	82.200	0.708
17.000	86.300	0.725
18.000	90.200	0.735
19.000	94.000	0.752
20.000	97.600	0.769
21.000	101.000	0.783
22.000	104.300	0.799
23.000	107.500	0.822
24.000	110.300	0.842
25.000	113.700	0.856
26.000	114.900	0.890
27.000	116.600	0.938
28.000	117.500	0.996

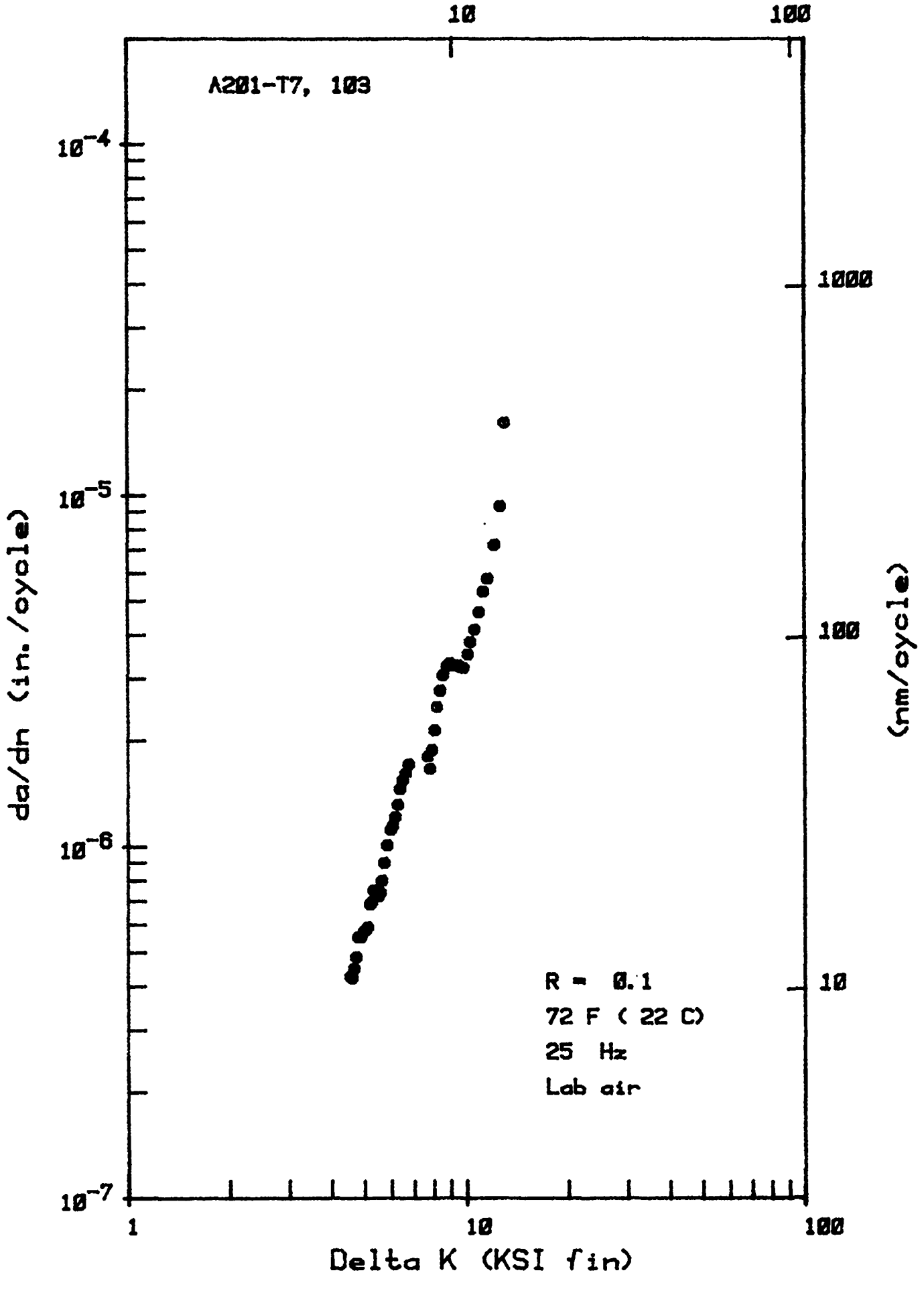
PT #	CYCLE COUNT	A-cor in	A-req in	MC	deltaK KSI√in	da/dn in/cy
1	50.000	0.502				
2	100.000	0.518				
3	150.000	0.540				
4	190.000	0.561	0.558	0.996697	4.56	0.4273
5	216.000	0.570	0.570	0.998637	4.59	0.4226
6	240.000	0.580	0.580	0.993526	4.65	0.4498
7	264.000	0.589	0.589	0.998165	4.71	0.4848
8	288.000	0.600	[illegible]	[illegible]	4.76	0.5531
9	312.000	0.616	0.617	0.989924	4.88	0.5527
10	332.000	0.630	0.629	0.994171	4.96	0.5725
11	349.000	0.641	0.639	0.994469	5.04	0.5800
12	379.000	0.652	0.655	0.991350	5.11	0.5900
13	394.000	0.663	0.663	0.994862	5.18	0.6855
14	408.000	0.672	0.672	0.990972	5.24	0.6960
15	422.000	0.683	0.684	0.995256	5.31	0.7516
16	436.000	0.698	0.695	0.995577	5.42	0.7439
17	454.000	0.707	0.708	0.996090	5.48	0.7216
18	468.000	0.718	0.718	0.993366	5.56	0.7385
19	482.000	0.727	0.726	0.997732	5.62	0.7995
20	496.000	0.737	0.738	0.998013	5.70	0.8994
21	512.000	0.753	0.754	0.998221	5.81	1.0086
22	527.000	0.772	0.770	0.998631	5.96	1.1161
23	539.000	0.784	0.785	0.999163	6.05	1.1466
24	550.000	0.797	0.797	0.996022	6.16	1.2122
25	560.000	0.810	0.809	0.998266	6.27	1.3146
26	569.000	0.819	0.821	0.998432	6.34	1.4592
27	578.000	0.834	0.834	0.997264	6.47	1.5457
28	586.500	0.849	0.849	0.996623	6.60	1.6103
29	595.000	0.865	0.863	0.998383	6.75	1.7133
30	603.000	0.876				
31	611.000	0.889				
32	619.000	0.906				
1	6.000	0.921				
2	11.800	0.936				
3	17.200	0.948				
4	22.600	0.957	0.957	0.994594	7.69	1.8065
5	28.000	0.967	0.965	0.989770	7.80	1.6637
6	33.000	0.976	0.978	0.990182	7.91	1.8816
7	42.000	0.987	0.987	0.995490	8.04	2.1391
8	46.900	0.998	0.998	0.998448	8.18	2.4941
9	51.800	1.013	1.012	0.998255	8.37	2.7785
10	56.500	1.025	1.026	0.997719	8.53	3.0742
11	61.100	1.042	1.041	0.997654	8.76	3.2687
12	65.500	1.053	1.056	0.996539	8.92	3.3194
13	69.900	1.073	1.071	0.996480	9.22	3.2714
14	74.100	1.086	1.085	0.995053	9.42	3.2702
15	78.200	1.098	1.098	0.995481	9.61	3.2270
16	82.200	1.108	1.110	0.997346	9.78	3.2234
17	86.300	1.125	1.123	0.997633	10.08	3.5200
18	90.200	1.135	1.137	0.997843	10.26	3.8234
19	94.000	1.152	1.152	0.998095	10.58	4.1480
20	97.600	1.169	1.167	0.997589	10.92	4.6430
21	101.000	1.183	1.184	0.997501	11.21	5.3216
22	104.300	1.199	1.201	0.998095	11.56	5.7959
23	107.500	1.222	1.220	0.992582	12.10	7.2313
24	110.300	1.242	1.240	0.990545	12.61	9.3227
25	112.700	1.256	1.262	0.921883	12.98	16.1339
26	114.900	1.290				
27	116.600	1.318				
28	117.500	1.396				

*-data violates specimen size requirements

Paris exponent 2.815

log of intercept -8.187

Paris coefficient 6.496*10^ -9.000


A201-T7, 103
10
100
10^{-4}
10^{-5}
10^{-6}
10^{-7}
da/dn (in./cycle)
1000
100
10
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. A201-77, 112

P_{max} = 480 LBF P_{min} = 48 LBF R = 0.100

B=0.366 in. W=2.881 in. Crack Correction = 0.400 in.

Obs. #	Cycle Count	a-measured
1.000	50.000	0.150
2.000	100.000	0.160
3.000	150.000	0.167
4.000	200.000	0.175
5.000	270.000	0.188
6.000	320.000	0.194
7.000	370.000	0.201
8.000	420.000	0.209
9.000	460.000	0.216
10.000	500.000	0.222
11.000	540.000	0.227
12.000	580.000	0.234
1.000	40.000	0.242
2.000	80.000	0.248
3.000	120.000	0.255
4.000	160.000	0.260
5.000	200.000	0.265
6.000	240.000	0.269
7.000	280.000	0.276
8.000	320.000	0.285
9.000	360.000	0.294
10.000	400.000	0.300
11.000	450.000	0.311
12.000	500.000	0.321
13.000	550.000	0.333
14.000	600.000	0.338
15.000	650.000	0.347
16.000	700.000	0.357
17.000	750.000	0.371
1.000	50.000	0.384
2.000	100.000	0.402
3.000	140.000	0.418
4.000	170.000	0.431
5.000	196.000	0.440
6.000	218.000	0.448
7.000	242.000	0.456
8.000	268.000	0.472
9.000	292.000	0.486
10.000	313.000	0.500
11.000	332.000	0.515
12.000	349.000	0.530
13.000	364.000	0.546
14.000	377.000	0.557
15.000	388.000	0.565
16.000	398.000	0.579
17.000	407.000	0.594
18.000	415.000	0.605
19.000	422.800	0.621
20.000	429.800	0.632
21.000	436.700	0.643
22.000	443.500	0.658
23.000	450.100	0.675
24.000	456.400	0.687
25.000	462.600	0.708
26.000	468.200	0.724
27.000	473.200	0.735
28.000	478.100	0.748
29.000	482.900	0.765
30.000	486.400	0.775
31.000	489.900	0.788
32.000	493.200	0.798
33.000	496.400	0.812
34.000	499.400	0.821
35.000	502.400	0.832
36.000	505.300	0.842
37.000	508.100	0.856
38.000	510.800	0.878
39.000	512.800	0.892
40.000	514.300	0.911
41.000	514.900	0.926

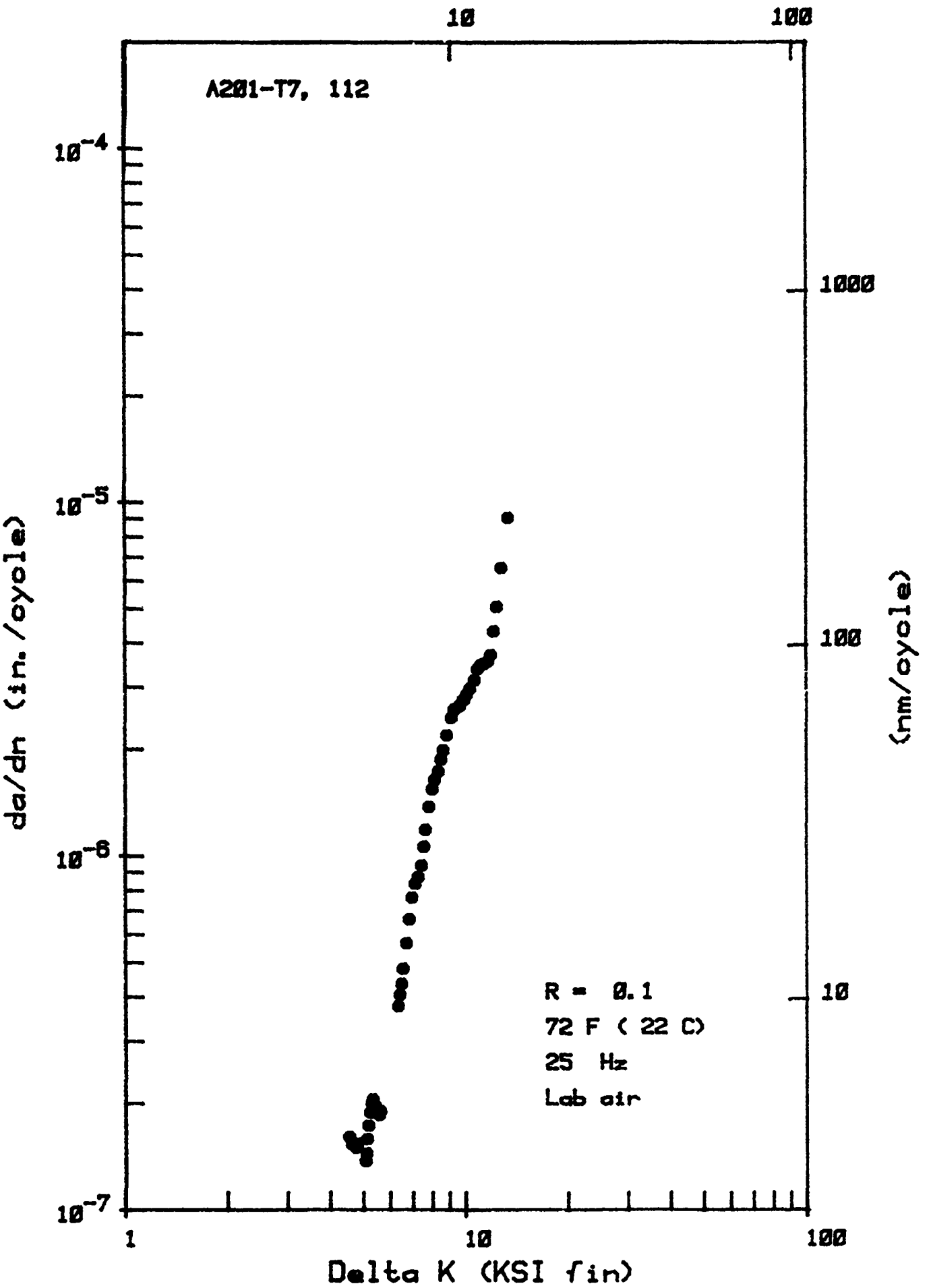
PT #	CYCLE COUNT	A-cor in	A-avg in	MC	deltaK KSI√in	da/dn uin/cy
1	50.000	0.550				
2	100.000	0.560				
3	150.000	0.567				
4	200.000	0.575	0.576	0.998299	4.54	0.1608
5	270.000	0.588	0.587	0.998193	4.62	0.1535
6	320.000	0.594	0.594	0.997860	4.65	0.1544
7	370.000	0.601	0.602	0.997546	4.69	0.1538
8	420.000	0.609	0.609	0.997974	4.74	0.1503
9	460.000	0.616	0.615	0.998829	4.79	0.1540
10	500.000	0.622				
11	540.000	0.627				
12	580.000	0.634				
1	40.000	0.642				
2	80.000	0.648				
3	120.000	0.655				
4	160.000	0.660	0.660	0.996197	5.06	0.1375
5	200.000	0.665	0.665	0.990975	5.10	0.1446
6	240.000	0.669	0.670	0.997209	5.12	0.1589
7	280.000	0.676	0.677	0.994262	5.17	0.1732
8	320.000	0.685	0.685	0.995350	5.23	0.1866
9	360.000	0.694	0.693	0.998650	5.29	0.2010
10	400.000	0.7[illegible]	[illegible]	[illegible]376	5.32	0.2054
11	450.000	0.711	0.712	0.995158	5.41	0.1968
12	500.000	0.721	0.721	0.995199	5.48	0.1885
13	550.000	0.733	0.731	0.995653	5.56	0.1857
14	600.000	0.738	0.739	0.991160	5.60	0.1900
15	650.000	0.747				
16	700.000	0.757				
17	750.000	0.771				
1	50.000	0.784				
2	100.000	0.802				
3	140.000	0.818				
4	170.000	0.831	0.830	0.999122	6.33	0.3769
5	196.000	0.840	0.840	0.995191	6.40	0.4056
6	218.000	0.848	0.848	0.995027	6.47	0.4352
7	242.000	0.856	0.858	0.998578	6.54	0.4805
8	268.000	0.872	0.871	0.999151	6.69	0.5668
9	292.000	0.886	0.886	0.999252	6.82	0.6619
10	313.000	0.900	0.901	0.998988	6.95	0.7630
11	332.000	0.915	0.915	0.999466	7.10	0.8352
12	349.000	0.930	0.930	0.997954	7.26	0.8729
13	364.000	0.946	0.944	0.997509	7.43	0.9391
14	377.000	0.957	0.957	0.993461	7.55	1.0615
15	388.000	0.965	0.968	0.994285	7.64	1.1845
16	398.000	0.979	0.979	0.998171	7.80	1.3770
17	407.000	0.994	0.992	0.997476	7.98	1.5422
18	415.000	1.005	1.006	0.998793	8.12	1.6413
19	422.800	1.021	1.020	0.998485	8.32	1.7323
20	429.800	1.032	1.031	0.997547	8.47	1.8744
21	436.700	1.043	1.045	0.997462	8.62	1.9877
22	443.500	1.058	1.058	0.998082	8.83	2.1926
23	450.100	1.075	1.073	0.998345	9.08	2.4524
24	456.400	1.087	1.090	0.997378	9.27	2.5963
25	462.600	1.108	1.107	0.996908	9.61	2.6511
26	468.200	1.124	1.122	0.996362	9.88	2.7693
27	473.200	1.135	1.136	0.996852	10.07	2.8623
28	478.100	1.148	1.149	0.998561	10.31	2.9725
29	482.900	1.165	1.164	0.998659	10.64	3.1433
30	486.400	1.175	1.175	0.998904	10.85	3.3729
31	489.900	1.188	1.188	0.998673	11.12	3.4573
32	493.200	1.198	1.199	0.998573	11.34	3.4957
33	496.400	1.212	1.211	0.998919	11.65	3.5471
34	499.400	1.221	1.221	0.997601	11.86	3.6934
35	502.400	1.232	1.231	0.989870	12.13	4.3140
36	505.300	1.242	1.243	0.996731	12.39	5.0572
37	508.100	1.256	1.258	0.996777	12.[illegible]	[illegible]
38	510.800	1.278	1.276	0.992688	13.37	9.0531
39	512.800	1.292				
40	514.300	1.311				
41	514.900	1.326				

*-data violates specimen size requirements

Paris exponent 3.948

log of intercept -9.515

Paris coefficient $3.056*10^{-10}$


A201-T7, 112
10
100
10^{-4}
10^{-5}
10^{-6}
10^{-7}
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. A301-T7, 203

Pmax = 600 LBF Pmin = 60 LBF R = 0.100

B=0.366 in. W=2.000 in Crack Correction =0.400 in.

Obs. #	Cycle Count	a-measured
1.000	30.000	0.110
2.000	60.000	0.120
3.000	90.000	0.128
4.000	125.000	0.139
5.000	160.000	0.148
6.000	200.000	0.159
7.000	240.000	0.170
8.000	280.000	0.190
9.000	320.000	0.214
10.000	360.000	0.233
11.000	400.000	0.259
12.000	430.000	0.278
13.000	460.000	0.292
14.000	490.000	0.311
15.000	520.000	0.332
16.000	550.000	0.357
17.000	575.000	0.379
18.000	600.000	0.398
1.000	25.000	0.430
2.000	45.000	0.458
3.000	65.000	0.485
4.000	75.000	0.500
5.000	85.000	0.513
6.000	95.000	0.536
7.000	105.000	0.553
8.000	115.000	0.567
9.000	125.000	0.587
10.000	135.000	0.604
11.000	145.000	0.629
12.000	155.000	0.659
13.000	160.000	0.675
14.000	165.000	0.690
15.000	170.000	0.705
16.000	175.000	0.720
17.000	180.000	0.732
18.000	185.000	0.752
19.000	190.000	0.765
20.000	195.000	0.779
21.000	200.000	0.795
22.000	205.000	0.809
23.000	215.000	0.872
24.000	217.000	0.882
25.000	219.000	0.887
26.000	221.000	0.897
27.000	225.000	0.992
28.000	227.000	0.963
29.000	228.000	0.975
30.000	229.000	1.072

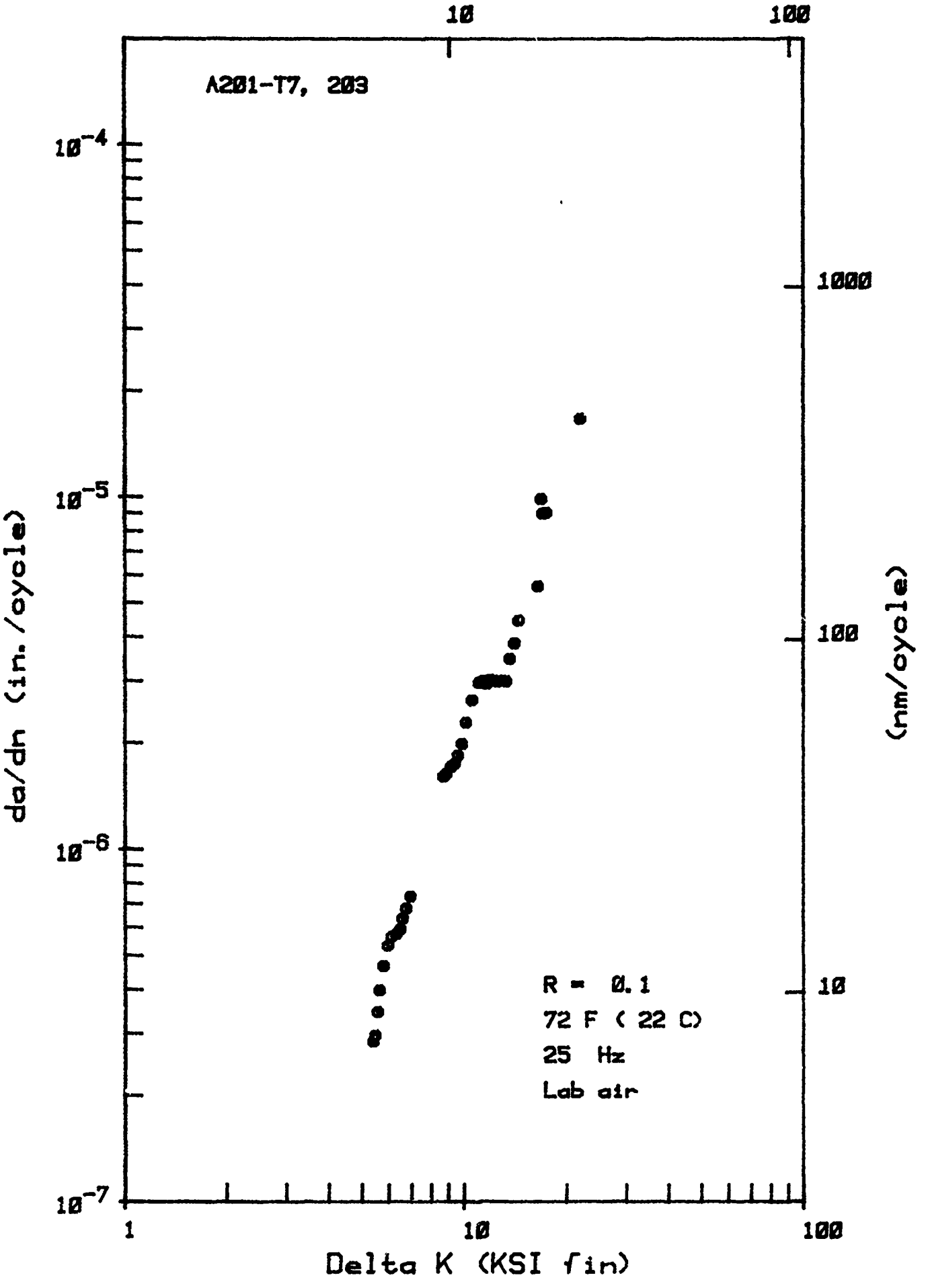
PT #	CYCLE COUNT	A-cor in	A-req in	MC	delta K KSI√in	da/dn in/cy
1	30.000	0.510				
2	60.000	0.520				
3	90.000	0.528				
4	125.000	0.539	0.538	0.999630	5.41	0.2855
5	160.000	0.548	0.547	0.994460	5.48	0.2973
6	200.000	0.559	0.558	0.993899	5.56	0.3467
7	240.000	0.570	0.573	0.997030	5.64	0.3996
8	280.000	0.590	0.590	0.997711	5.79	0.4687
9	320.000	0.614	0.611	0.998195	5.97	0.5349
10	360.000	0.633	0.635	0.998725	6.12	0.5671
11	400.000	0.659	0.658	0.998725	6.33	0.5772
12	430.000	0.678	0.676	0.998380	6.48	0.5946
13	460.000	0.692	0.694	0.997232	6.60	0.6373
14	490.000	0.711	0.711	0.998960	6.76	0.6803
15	520.000	0.732	0.733	0.999020	6.95	0.7354
16	550.000	0.757				
17	575.000	0.779				
18	600.000	0.798				
1	25.000	0.830				
2	45.000	0.858				
3	65.000	0.885				
4	75.000	0.900	0.900	0.997939	8.70	1.6102
5	85.000	0.913	0.916	0.996683	8.86	1.6367
6	95.000	0.936	0.934	0.996697	9.16	1.7143
7	105.000	0.953	0.951	0.997259	9.39	1.7536
8	115.000	0.967	0.969	0.995836	9.59	1.8500
9	125.000	0.987	0.985	0.998002	9.88	1.9929
10	135.000	1.004	1.005	0.999127	10.14	2.2913
11	145.000	1.029	1.030	0.999178	10.54	2.6502
12	155.000	1.059	1.058	0.998789	11.07	2.9707
13	160.000	1.075	1.074	0.999523	11.36	3.0047
14	165.000	1.090	1.090	0.999592	11.65	2.9507
15	170.000	1.105	1.104	0.998000	11.96	3.0214
16	175.000	1.120	1.119	0.998131	12.28	3.0071
17	180.000	1.132	1.135	0.997870	12.54	2.9929
18	185.000	1.152	1.150	0.997891	13.00	3.0071
19	190.000	1.165	1.165	0.997949	13.32	3.0000
20	195.000	1.179	1.177	0.988347	13.68	3.4771
21	200.000	1.195	1.193	0.996343	14.11	3.8461
22	205.000	1.209	1.214	0.994227	14.50	4.4547
23	215.000	1.272	1.266	0.990934	16.53	5.5794
24	217.000	1.282	1.277	0.950870	16.89	9.8795
25	219.000	1.287	1.296	0.908512	17.08	8.9865
26	221.000	1.297	1.314	0.856935	17.47	9.0269
27	225.000	1.392	1.354	0.826979	22.01	16.6829
28	227.000	1.363				
29	228.000	1.375				
30	229.000	1.472				

*-data violates specimen size requirements

Paris exponent 2.662

log of intercept -8.384

Paris coefficient $4.133*10^{-9.000}$


A201-T7, 203
10
100
10^{-4}
10^{-5}
10^{-6}
10^{-7}
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. A201-T7, 212

Pmax = 600 LBF Pmin = 60 LBF R = 0.100

B=0.367 in. W=1.999 in. Crack Correction =0.399 in.

Obs. #	Cycle Count	a-measured
1.000	30.000	0.060
2.000	60.000	0.064
3.000	90.000	0.076
4.000	120.000	0.085
5.000	150.000	0.091
6.000	180.000	0.099
7.000	210.000	0.107
8.000	240.000	0.120
9.000	250.000	0.122
10.000	260.000	0.127
11.000	290.000	0.140
12.000	320.000	0.148
13.000	350.000	0.155
14.000	380.000	0.162
15.000	410.000	0.173
16.000	440.000	0.186
17.000	470.000	0.197
1.000	10.000	0.206
2.000	20.000	0.207
3.000	30.000	0.218
4.000	40.000	0.225
5.000	50.000	0.226
6.000	80.000	0.231
7.000	110.000	0.261
8.000	125.000	0.270
9.000	140.000	0.284
10.000	155.000	0.295
11.000	170.000	0.302
12.000	185.000	0.312
13.000	200.000	0.324
14.000	215.000	0.333
15.000	230.000	0.347
16.000	245.000	0.363
17.000	260.000	0.377
18.000	275.000	0.397
19.000	285.000	0.411
20.000	295.000	0.425
21.000	305.000	0.440
22.000	315.000	0.458
23.000	325.000	0.474
24.000	335.000	0.499
25.000	345.000	0.518
26.000	350.000	0.532
27.000	355.000	0.545
28.000	360.000	0.562
29.000	365.000	0.574
30.000	370.000	0.586
31.000	375.000	0.603
32.000	380.000	0.621
33.000	385.000	0.637
34.000	390.000	0.661
35.000	395.000	0.678
36.000	400.000	0.707
37.000	405.000	0.727
38.000	410.000	0.755
39.000	415.000	0.783
40.000	420.000	0.814
41.000	425.000	0.857
42.000	427.500	0.882
43.000	429.500	0.907
44.000	430.500	0.916
45.000	431.500	0.927
46.000	433.000	0.943
47.000	434.000	0.954
48.000	435.000	0.984
49.000	435.200	0.993
50.000	435.600	1.026
51.000	435.800	1.065

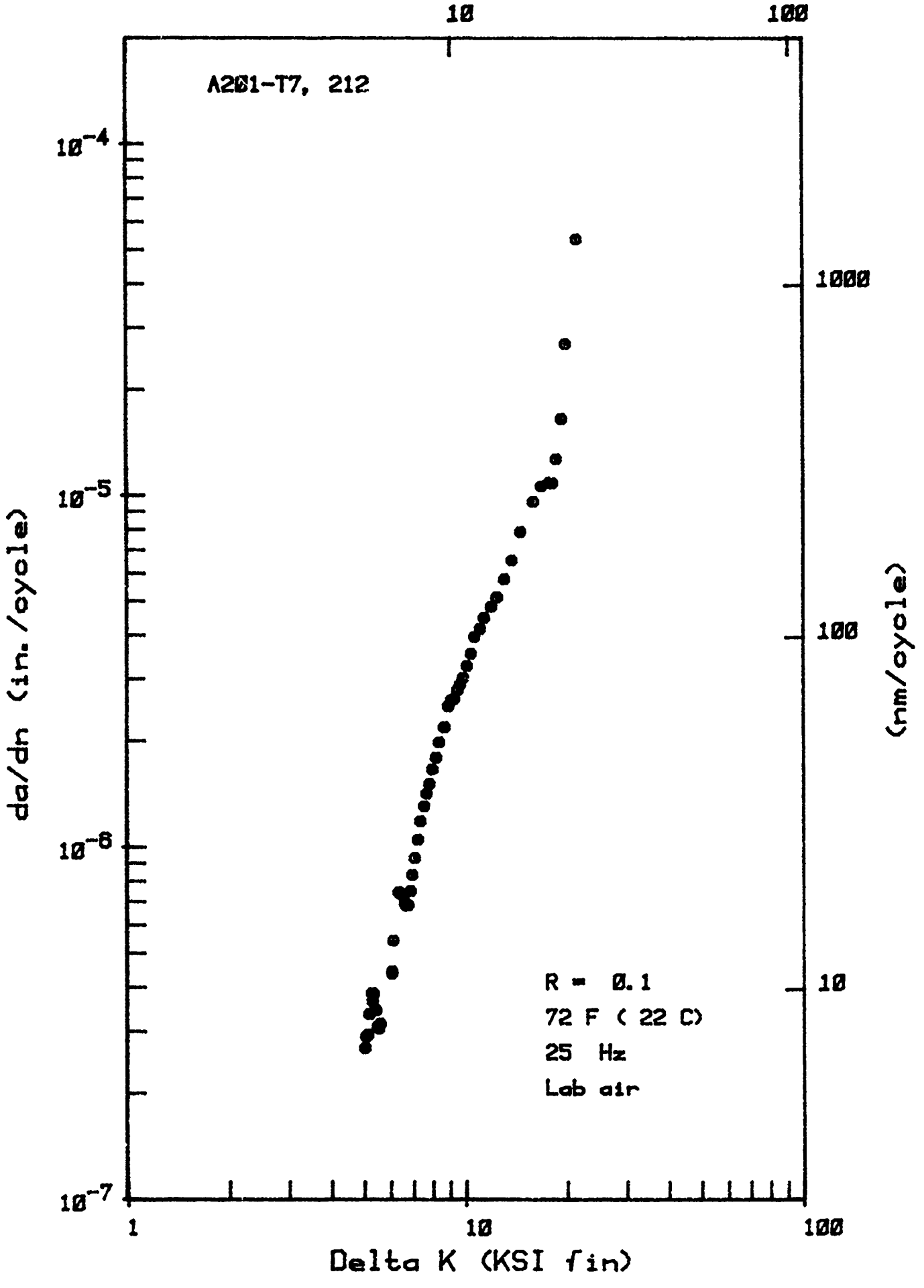
PT #	CYCLE COUNT	A-corr in	A-req in	MC	deltaK KSI√in	da/dn min/cy
1	30.000	0.459				
2	60.000	0.463				
3	90.000	0.475				
4	120.000	0.484	0.482	0.992231	5.02	0.2690
5	150.000	0.490	0.491	0.990242	5.06	0.2905
6	180.000	0.498	0.498	0.995923	5.11	0.2937
7	210.000	0.506	0.507	0.998114	5.17	0.3361
8	240.000	0.519	0.518	0.998213	5.26	0.3852
9	250.000	0.521	0.522	0.993725	5.27	0.3652
10	260.000	0.526	0.527	0.996126	5.31	0.3839
11	290.000	0.539	0.538	0.996710	5.40	0.3442
12	320.000	0.547	0.546	0.991721	5.46	0.3099
13	350.000	0.554	0.554	0.989406	5.51	0.3060
14	380.000	0.561	0.562	0.997887	5.56	0.3155
15	410.000	0.572				
16	440.000	0.585				
17	470.000	0.596				
1	10.000	0.605				
2	20.000	0.606				
3	30.000	0.617				
4	40.000	0.624	0.618	0.929330	6.04	0.4446
5	50.000	0.625	0.622	0.955330	6.04	0.4378
6	80.000	0.630	0.635	0.963352	6.08	0.5436
7	110.000	0.660	0.656	0.983997	6.32	0.7441
8	125.000	0.669	0.668	0.978621	6.40	0.7388
9	140.000	0.683	0.683	0.997902	6.51	0.7293
10	155.000	0.694	0.692	0.995598	6.60	0.6929
11	170.000	0.701	0.702	0.995492	6.66	0.6810
12	185.000	0.711	0.711	0.997602	6.75	0.6833
13	200.000	0.723	0.721	0.998422	6.85	0.7500
14	215.000	0.732	0.733	0.998618	6.94	0.8333
15	230.000	0.746	0.746	0.998733	7.06	0.9310
16	245.000	0.762	0.760	0.999136	7.21	1.0488
17	260.000	0.776	0.778	0.999336	7.34	1.1836
18	275.000	0.796	0.796	0.999458	7.54	1.3069
19	285.000	0.810	0.809	0.999510	7.68	1.4168
20	295.000	0.824	0.824	0.999724	7.82	1.5116
21	305.000	0.839	0.839	0.998540	7.98	1.6607
22	315.000	0.857	0.856	0.998750	8.18	1.7964
23	325.000	0.873	0.875	0.998744	8.36	1.9831
24	335.000	0.898	0.896	0.998650	8.66	2.1893
25	345.000	0.917	0.919	0.997998	8.90	2.5140
26	350.000	0.931	0.932	0.997564	9.08	2.6131
27	355.000	0.944	0.944	0.996376	9.25	2.6347
28	360.000	0.961	0.959	0.998181	9.48	2.8000
29	365.000	0.973	0.973	0.997314	9.66	2.9071
30	370.000	0.985	0.987	0.997738	9.83	3.0214
31	375.000	1.002	1.001	0.998970	10.09	3.2714
32	380.000	1.020	1.019	0.998276	10.38	3.5429
33	385.000	1.036	1.037	0.997901	10.64	3.9500
34	390.000	1.060	1.058	0.997773	11.07	4.1786
35	395.000	1.077	1.080	0.998056	11.38	4.4857
36	400.000	1.106	1.103	0.998417	11.96	4.8214
37	405.000	1.126	1.127	0.998785	12.39	5.1214
38	410.000	1.154	1.153	0.997619	13.03	5.7643
39	415.000	1.182	1.181	0.999000	13.74	6.5237
40	420.000	1.213	1.216	0.998244	14.60	7.8690
41	425.000	1.256	1.257	0.999420	15.95	9.5951
42	427.500	1.281	1.281	0.999514	16.84	10.6313
43	429.500	1.306	1.303	0.999026	17.81	10.8876
44	430.500	1.315	1.315	0.999159	18.18	10.[illegible]
45	431.500	1.326	1.325	0.979784	18.66	12.6 [illegible]
46	433.000	1.342	1.342	0.984466	19.39	16.503[illegible]
47	434.000	1.353	1.359	0.962774	19.92	26.9392
48	435.000	1.383	1.395	0.931077	21.49	53.5132
49	435.200	1.392				
50	435.600	1.425				
51	435.800	1.464				

*-data violates specimen size requirements

Paris exponent 3.127

log of intercept -8.694

Paris coefficient 2.021*10^ -9.000


A201-T7, 212
10
100
10^{-4}
10^{-5}
10^{-6}
10^{-7}
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. A201-T7, 222

Pmax = 600 LBF Pmin = 60 LBF P = 0.100

B=0.367 in. W=1.999 in. Crack Correction =0.407 in.

Obs. #	Cycle Count	a-measured
1.000	10.000	0.088
2.000	40.000	0.098
3.000	70.000	0.107
4.000	100.000	0.119
5.000	130.000	0.136
6.000	160.000	0.150
7.000	190.000	0.169
8.000	220.000	0.187
9.000	250.000	0.201
10.000	280.000	0.213
11.000	310.000	0.235
12.000	340.000	0.257
13.000	370.000	0.279
14.000	385.000	0.290
15.000	400.000	0.304
16.000	415.000	0.313
17.000	430.000	0.322
18.000	445.000	0.330
19.000	460.000	0.346
20.000	475.000	0.365
21.000	485.000	0.377
22.000	495.000	0.384
23.000	505.000	0.397
1.000	15.000	0.401
2.000	20.000	0.416
3.000	25.000	0.426
4.000	30.000	0.435
5.000	35.000	0.447
6.000	40.000	0.456
7.000	45.000	0.463
8.000	50.000	0.474
9.000	55.000	0.483
10.000	60.000	0.494
11.000	65.000	0.508
12.000	70.000	0.520
13.000	75.000	0.530
14.000	80.000	0.542
15.000	85.000	0.555
16.000	90.000	0.572
17.000	95.000	0.584
18.000	100.000	0.[illegible]
19.000	105.000	0.604
20.000	110.000	0.607
21.000	115.000	0.627
22.000	120.000	0.653
23.000	125.000	0.671
24.000	130.000	0.688
25.000	135.000	0.712
26.000	137.500	0.716
27.000	140.000	0.730
28.000	142.500	0.745
29.000	145.000	0.754
30.000	147.000	0.758
31.000	149.000	0.773
32.000	151.000	0.780
33.000	153.000	0.789
34.000	155.000	0.806
35.000	156.000	0.812
36.000	157.000	0.820
37.000	157.500	0.823
38.000	159.500	0.835
39.000	160.500	0.839
40.000	161.500	0.847
41.000	162.500	0.852
42.000	163.500	0.862
43.000	164.500	0.868
44.000	165.500	0.880
45.000	166.000	0.885
46.000	166.500	0.888
47.000	167.000	0.898
48.000	167.500	0.903
49.000	167.700	0.907
50.000	167.900	0.908
51.000	168.100	0.920
52.000	168.200	0.920
53.000	168.500	0.924
54.000	168.700	0.928
55.000	168.900	0.930
56.000	169.100	0.936
57.000	169.300	0.939
58.000	169.500	0.958
59.000	169.700	0.959
60.000	169.900	0.962
61.000	170.100	0.979

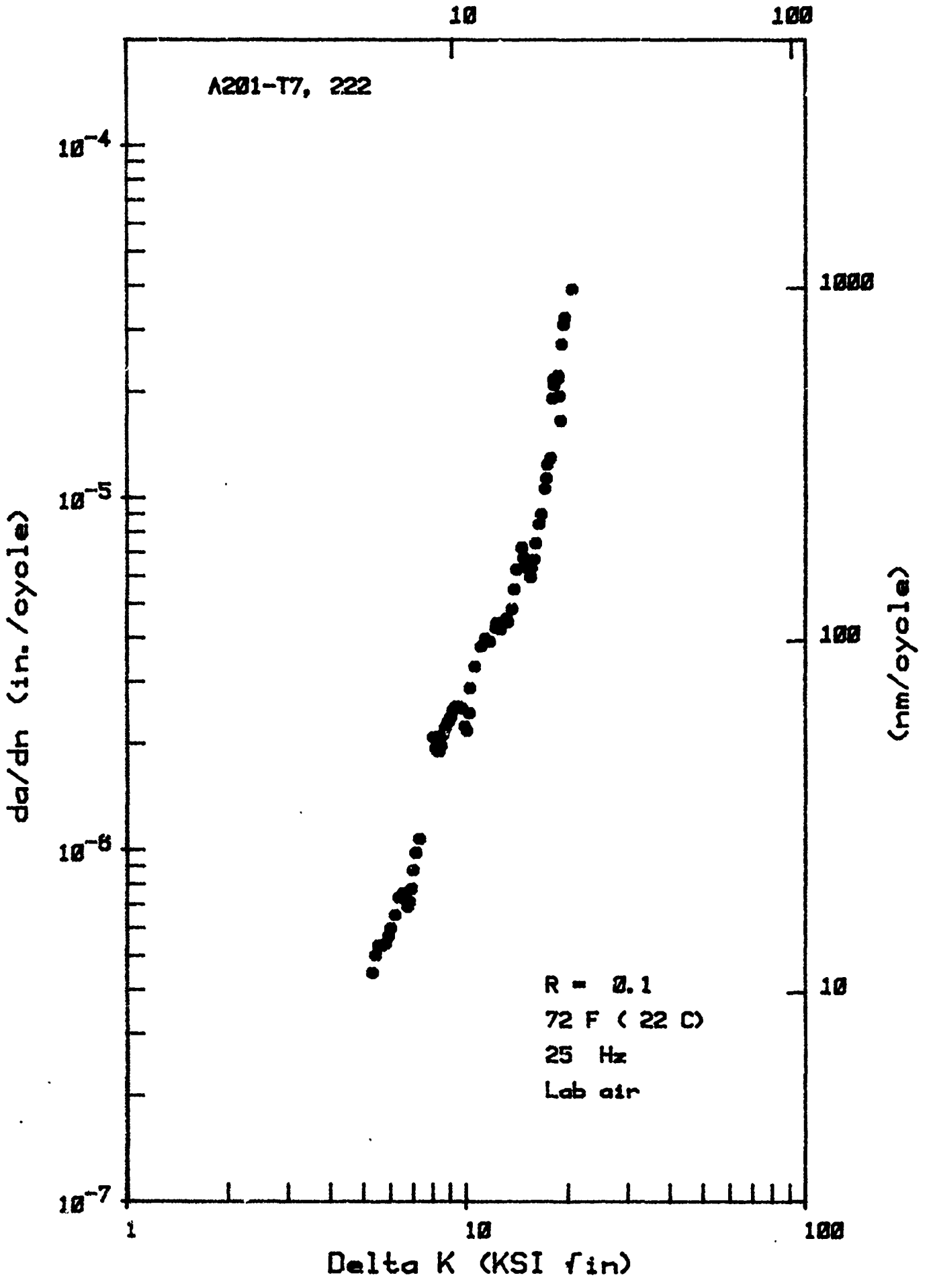
Pt #	CYCLE COUNT	A-cor in	A-reg in	MC	deltaK KSI√in	da/dn in/cy
1	10.000	0.495				
2	40.000	0.505				
3	70.000	0.514				
4	100.000	0.526	0.527	0.998923	5.31	0.4476
5	130.000	0.543	0.541	0.998964	5.43	0.5024
6	160.000	0.557	0.559	0.998124	5.53	0.5369
7	190.000	0.576	0.576	0.997766	5.67	0.5345
8	220.000	0.594	0.592	0.995978	5.81	0.5417
9	250.000	0.608	0.607	0.994225	5.91	0.5702
10	280.000	0.620	0.623	0.997094	6.01	0.6000
11	310.000	0.642	0.641	0.998400	6.18	0.6539
12	340.000	0.664	0.662	0.998442	6.35	0.7339
13	370.000	0.686	0.686	0.999442	6.54	0.7549
14	385.000	0.697	0.698	0.998550	6.63	0.7297
15	400.000	0.711	0.709	0.997683	6.75	0.6913
16	415.000	0.720	0.719	0.992290	6.83	0.7119
17	430.000	0.729	0.729	0.988198	6.91	0.7762
18	445.000	0.737	0.739	0.997123	6.98	0.8762
19	460.000	0.753	0.754	0.992904	7.13	0.9825
20	475.000	0.772	0.770	0.993382	7.30	1.0763
21	485.000	0.784				
22	495.000	0.791				
23	505.000	0.804				
1	15.000	0.808				
2	20.000	0.823				
3	25.000	0.833				
4	30.000	0.842	0.844	0.997791	8.07	2.0929
5	35.000	0.854	0.853	0.999053	8.15	1.9500
6	40.000	0.863	0.863	0.999160	8.25	1.9071
7	45.000	0.872	0.872	0.998227	8.35	1.9071
8	50.000	0.881	0.881	0.998361	8.46	1.9786
9	55.000	0.890	0.891	0.999121	8.56	2.1286
10	60.000	0.901	0.902	0.997478	8.70	2.2286
11	65.000	0.915	0.914	0.997909	8.87	2.3143
12	70.000	0.927	0.926	0.998866	9.02	2.3857
13	75.000	0.937	0.937	0.996848	9.16	2.5000
14	80.000	0.949	0.950	0.998324	9.32	2.5500
15	85.000	0.962	0.963	0.994786	9.50	2.5500
16	90.000	0.979	0.977	0.996694	9.74	2.5214
17	95.000	0.991	0.991	0.996581	9.92	2.2429
18	100.000	1.000	1.000	0.978048	10.06	2.1857
19	105.000	1.011	1.008	0.973061	10.23	2.4500
20	110.000	1.014	1.020	0.987497	10.28	2.8857
21	115.000	1.034	1.036	0.985485	10.61	3.3214
22	120.000	1.060	1.055	0.988827	11.07	3.7857
23	125.000	1.078	1.078	0.997168	11.40	3.9874
24	130.000	1.095	1.098	0.995664	11.74	3.9065
25	135.000	1.119	1.116	0.995270	12.24	4.2780
26	137.500	1.123	1.126	0.994199	12.32	4.4084
27	140.000	1.137	1.138	0.987873	12.64	4.2379
28	142.500	1.152	1.148	0.982672	12.99	4.4387
29	145.000	1.161	1.161	0.988668	13.20	4.5564
30	147.000	1.165	1.169	0.988024	13.30	4.4386
31	149.000	1.180	1.177	0.989782	13.69	4.8376
32	151.000	1.187	1.187	0.990607	13.87	5.5103
33	153.000	1.196	1.199	0.991221	14.12	6.2724
34	155.000	1.213	1.211	0.996027	14.60	7.2400
35	156.000	1.219	1.219	0.993964	14.77	6.7706
36	157.000	1.227	1.227	0.999124	15.02	6.5754
37	157.500	1.230	1.230	0.996619	15.11	6.3502
38	158.000	1.242	1.242	0.996475	15.49	5.9658
39	158.500	1.246	1.247	0.995635	15.62	6.3699
40	159.000	1.254	1.253	0.995822	15.88	6.6701
41	159.500	1.259	1.260	0.995394	16.05	7.4286
42	160.000	1.269	1.268	0.995866	16.40	8.4420
43	160.500	1.275	1.276	0.994256	16.62	8.9931
44	161.000	1.287	1.286	0.991319	17.06	10.6342
45	161.500	1.292	1.291	0.991902	17.25	11.3854
46	162.000	1.295	1.297	0.991011	17.37	12.4460
47	162.500	1.305	1.303	0.987210	17.77	12.9851
48	163.000	1.310	1.311	0.958796	17.98	19.1649
49	163.250	1.314	1.315	0.954047	18.14	21.7048
50	163.500	1.315	1.318	0.935132	18.18	20.9224
51	163.750	1.327	1.324	0.943775	18.70	21.8747
52	164.000	1.327	1.326	0.946386	18.70	22.2315
53	164.250	1.331	1.332	0.932608	18.88	19.4718
54	164.500	1.335	1.334	0.990537	19.06	16.6080
55	164.750	1.337	1.337	0.942461	19.16	27.3223
56	165.000	1.343	1.343	0.944179	19.44	31.0714
57	165.250	1.346	1.351	0.922880	19.58	32.5000
58	165.500	1.365	1.358	0.942032	20.52	39.1071
59	165.750	1.366				
60	166.000	1.369				
61	170.100	1.386				

*-data violates specimen size requirements

Paris exponent 2.903

log of intercept -8.477

Paris coefficient 3.331*10^ -9.000


A201-T7, 222
10
100
10^{-4}
10^{-5}
10^{-6}
10^{-7}
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 15CC1

Pmax = 700 LBF Pmin = 70 LBF P = 0.100

B=0.375 in. W=2.001 in. Crack Correction =0.403 in.

Obs. #	Cycle Count	a-measured
1.000	18.000	0.422
2.000	30.000	0.438
3.000	40.000	0.457
4.000	50.000	0.478
5.000	60.000	0.493
6.000	62.000	0.501
7.000	66.000	0.521
8.000	69.000	0.533
9.000	71.000	0.542
10.000	73.000	0.552
11.000	75.000	0.581
12.000	79.000	0.592
13.000	83.000	0.601
14.000	85.000	0.611
15.000	87.000	0.629
16.000	89.000	0.636
17.000	91.000	0.656
18.000	93.000	0.672
19.000	94.000	0.680
20.000	95.000	0.691
21.000	96.000	0.684
22.000	97.000	0.710
23.000	98.000	0.725
24.000	99.000	0.741
25.000	99.700	0.751
26.000	100.400	0.758
27.000	101.100	0.770
28.000	101.800	0.788
29.000	102.300	0.800
30.000	102.700	0.814
31.000	103.100	0.844
32.000	103.300	0.873
33.000	103.400	0.927

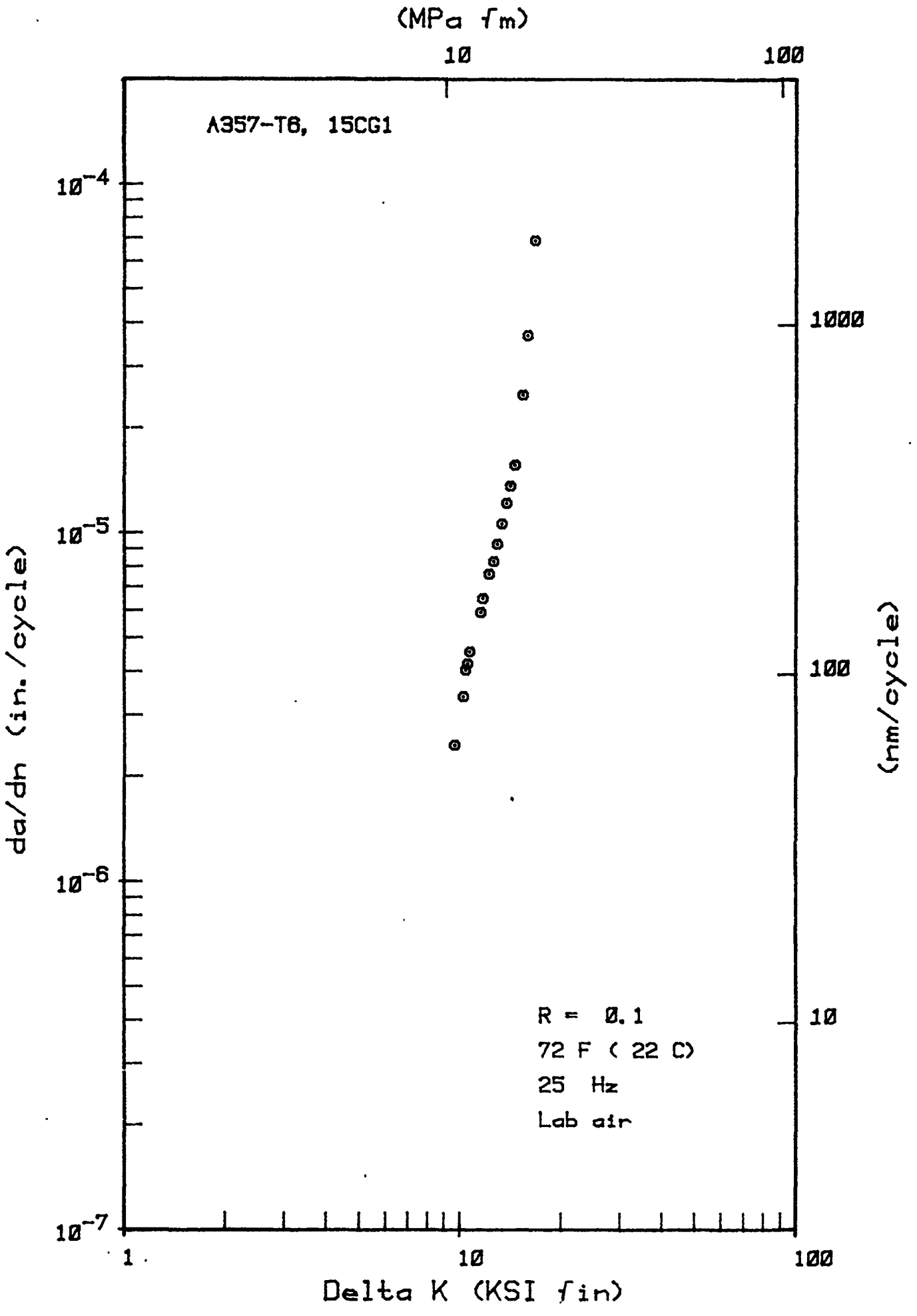
PT #	CYCLE COUNT	A-cor in	A-req in	MC	deltaK KSI√in	da/dn uin/cy
1	18.000	0.825				
2	30.000	0.841				
3	40.000	0.860				
4	50.000	0.881	0.881	0.999145	9.64	2.4645
5	66.000	0.924	0.927	0.997978	10.24	3.3923
6	69.000	0.936	0.937	0.998912	10.42	4.0444
7	71.000	0.945	0.945	0.999612	10.56	4.2196
8	73.000	0.955	0.954	0.999750	10.71	4.5684
9	83.000	1.004	1.003	0.998138	11.53	5.9221
10	85.000	1.014	1.015	0.998429	11.71	6.4863
11	89.000	1.039	1.042	0.998580	12.19	7.6250
12	91.000	1.059	1.057	0.998880	12.59	8.2856
13	93.000	1.075	1.075	0.998444	12.92	9.2944
14	95.000	1.094	1.094	0.996284	13.35	10.6351
15	97.000	1.113	1.116	0.998632	13.79	12.1915
16	98.000	1.128	1.128	0.997672	14.16	13.6468
17	99.000	1.144	1.141	0.994728	14.57	15.6880
18	101.100	1.173	1.177	0.980354	15.38	24.8762
19	101.800	1.191	1.194	0.966578	15.92	36.7664
20	102.700	1.217	1.239	0.894252	16.75	68.8748
21	103.100	1.247				
22	103.300	1.276				
23	103.400	1.330				

*-data violates specimen size requirements

Paris exponent 5.150

log of intercept -10.695

Paris coefficient 2.018*10^-11.000


(MPa √m)
10
100
A357-T6, 15CG1
10⁻⁴
10⁻⁵
10⁻⁶
10⁻⁷
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 36CC1

Pmax = 600 LBF Pmin = 60 LBF R = 0.100

B=0.373 in. W=2.000 in Crack Correction =0.404 in.

Obs. f	Cycle Count	a-measured
1.000	0.000	0.334
2.000	20.000	0.354
3.000	30.000	0.367
4.000	40.000	0.388
5.000	50.000	0.406
6.000	60.000	0.424
7.000	70.000	0.443
8.000	80.000	0.478
9.000	85.000	0.502
10.000	90.000	0.518
11.000	92.800	0.537
12.000	96.000	0.550
13.000	99.000	0.561
14.000	102.000	0.579
15.000	105.000	0.602
16.000	108.000	0.618
17.000	111.000	0.641
18.000	112.500	0.650
19.000	114.500	0.668
20.000	116.500	0.687
21.000	118.500	0.705
22.000	120.000	0.712
23.000	121.500	0.728
24.000	123.000	0.745
25.000	124.500	0.756
26.000	126.000	0.768
27.000	127.500	0.790
28.000	128.500	0.814
29.000	129.500	0.823
30.000	130.800	0.840
31.000	131.500	0.860
32.000	132.100	0.881
33.000	132.500	0.892
34.000	132.700	0.907
35.000	133.000	0.920
36.000	133.200	0.944
37.000	133.500	0.982

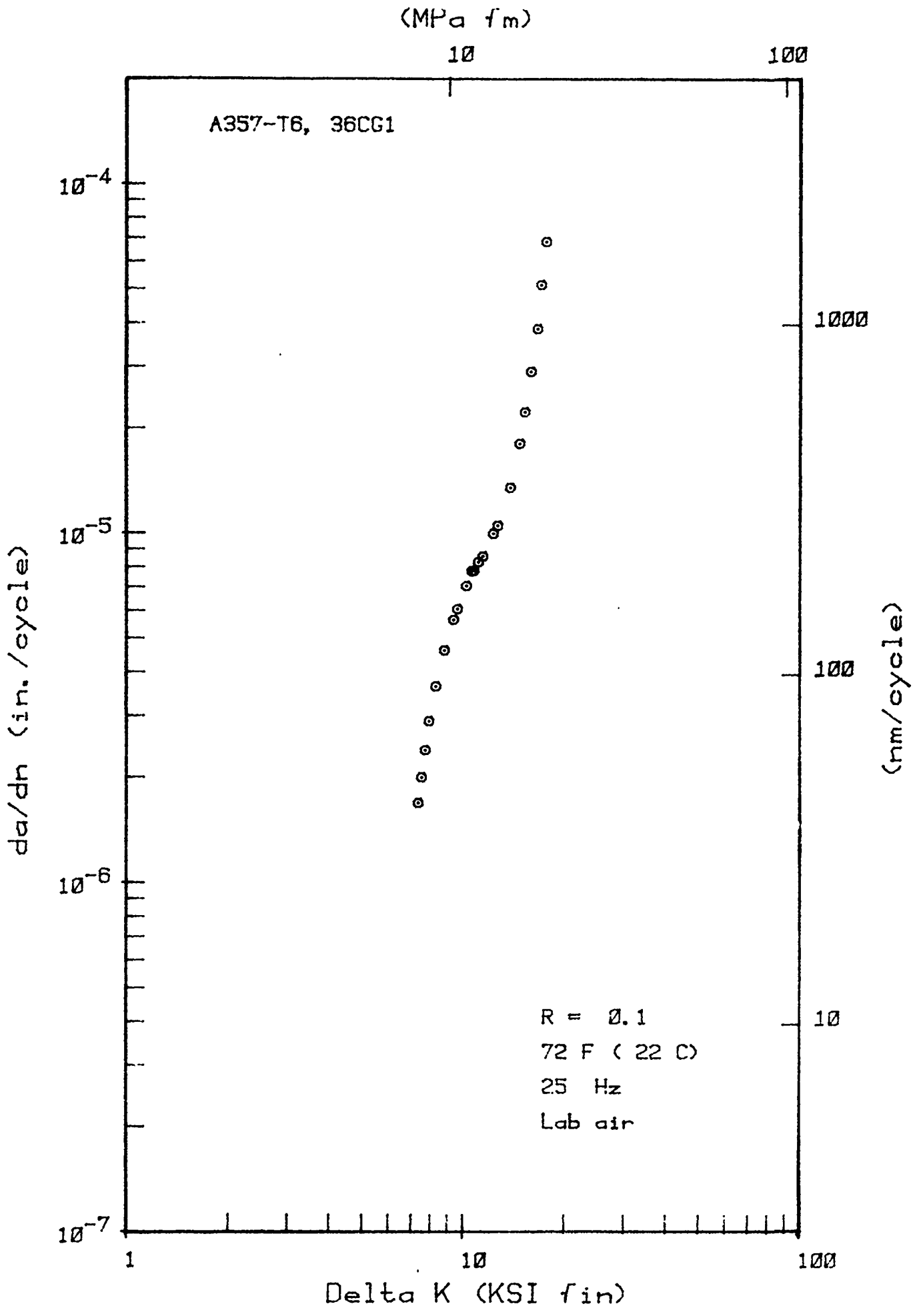
PT #	CYCLE COUNT	A-cor in	A-rec in	MC	delta K ksi√in	da/dn in/cyc
1	0.001	0.738				
2	20.000	0.758				
3	30.000	0.773				
4	40.000	0.792	0.790	0.997154	7.37	1.6893
5	50.000	0.810	0.808	0.994669	7.55	2.0000
6	60.000	0.826	0.827	0.993497	7.73	2.3929
7	70.000	0.847	0.851	0.998111	7.93	2.8989
8	80.000	0.882	0.881	0.999533	8.33	3.6404
9	90.000	0.922	0.921	0.999553	8.81	4.6233
10	99.000	0.965	0.967	0.999220	9.38	5.6500
11	102.000	0.983	0.984	0.999732	9.63	6.0643
12	108.000	1.022	1.022	0.999786	10.13	7.0574
13	111.000	1.045	1.044	0.999458	10.61	7.7858
14	112.500	1.054	1.056	0.999187	10.77	7.8197
15	114.500	1.072	1.072	0.999010	11.09	8.2547
16	116.500	1.091	1.089	0.999277	11.46	8.5917
17	121.500	1.132	1.133	0.997605	12.31	9.9730
18	123.000	1.149	1.147	0.998267	12.69	10.5085
19	127.500	1.194	1.199	0.996563	13.81	13.4957
20	129.500	1.227	1.226	0.993668	14.75	18.0496
21	130.800	1.244	1.251	0.993680	15.28	22.2158
22	131.500	1.264	1.267	0.989280	15.94	28.9816
23	132.100	1.285	1.284	0.996823	16.69	38.4316
24	132.500	1.296	1.301	0.985746	17.10	51.3298
25	132.700	1.313	1.309	0.984986	17.70	68.3152
26	133.000	1.324				
27	133.200	1.348				
28	133.500	1.386				

*-Data violates specimen size requirement

[illegible] exponent 3.513

log of [illegible]ercept -.744

[illegible] coefficient [illegible] -3.100


(MPa √m)
10
100
A357-T6, 36CG1
10^-4
10^-5
10^-6
10^-7
da/dn (in./cycle)
1000
100
10
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 37CC1

Pmax = 800 LBF Pmin = 80 LBF R = 0.100

B=0.375 in. W=2.001 in. Crack Correction =0.389 in.

Obs. #	Cycle Count	a-measured
1.000	0.001	0.110
2.000	34.000	0.118
3.000	53.000	0.127
4.000	64.000	0.135
5.000	82.000	0.145
6.000	105.000	0.157
7.000	123.500	0.167
8.000	139.000	0.177
9.000	160.000	0.187
10.000	180.000	0.197
11.000	193.000	0.207
12.000	207.500	0.217
13.000	228.500	0.226
14.000	242.000	0.236
15.000	260.000	0.246
16.000	276.000	0.256
17.000	288.000	0.266
18.000	302.500	0.276
19.000	315.000	0.285
20.000	332.000	0.298
21.000	345.000	0.305
22.000	356.000	0.315
23.000	364.500	0.325
24.000	370.200	0.335
25.000	375.200	0.344
26.000	381.100	0.354
27.000	386.100	0.364
28.000	391.200	0.374
29.000	396.400	0.384
30.000	403.100	0.394
31.000	406.800	0.404
32.000	410.300	0.413
33.000	414.000	0.423
34.000	416.300	0.433
35.000	418.900	0.443
36.000	422.100	0.453
37.000	425.300	0.463
38.000	427.400	0.472
39.000	429.800	0.482
40.000	432.200	0.492
41.000	434.300	0.502
42.000	436.300	0.512
43.000	438.200	0.522
44.000	439.800	0.531
45.000	441.400	0.541
46.000	442.700	0.551
47.000	444.500	0.561
48.000	446.100	0.571
49.000	447.300	0.581
50.000	448.500	0.591
51.000	449.800	0.600
52.000	451.000	0.610
53.000	451.800	0.620
54.000	452.690	0.630
55.000	453.590	0.640
56.000	454.280	0.650
57.000	454.980	0.659
58.000	455.690	0.669
59.000	456.320	0.679
60.000	456.870	0.689
61.000	457.500	0.699
62.000	458.160	0.709
63.000	458.550	0.719
64.000	458.980	0.728
65.000	459.450	0.738
66.000	459.800	0.749
67.000	460.080	0.758
68.000	460.305	0.768
69.000	460.472	0.778
70.000	460.670	0.787
71.000	460.779	0.795
72.000	460.922	0.803
73.000	461.046	0.811
74.000	461.171	0.819
75.000	461.273	0.835
76.000	461.473	0.839
77.000	461.557	0.843
78.000	461.663	0.866
79.000	461.833	0.898
80.000	461.926	0.921
81.000	461.929	0.921

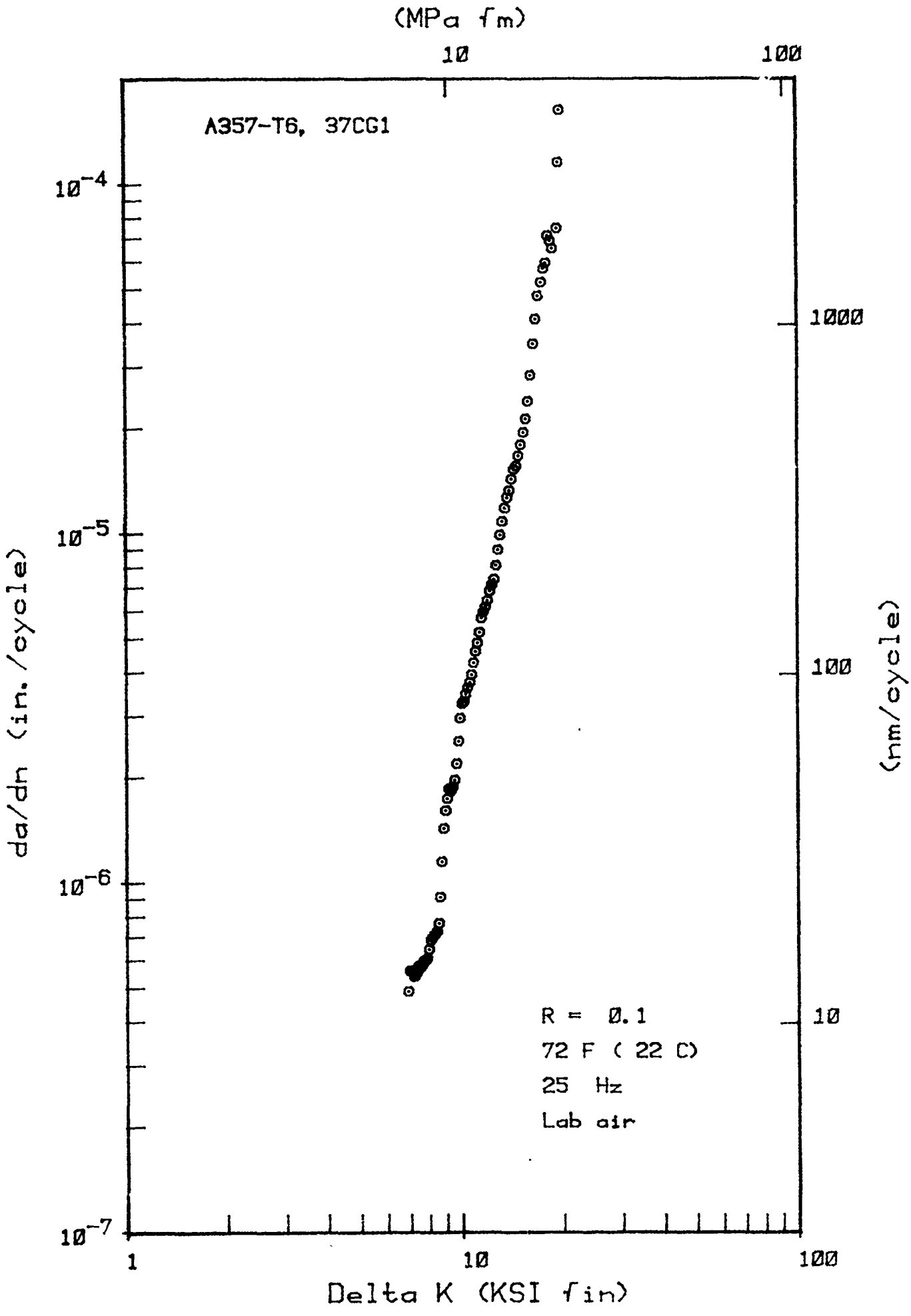
PT #	CYCLE COUNT	A-cor in	A-req in	MC	delta K ksi√in	da/dn in/cy
1	0.001	0.499				
2	34.000	0.507				
3	53.000	0.516				
4	64.000	0.524	0.523	0.993180	6.90	0.4886
5	82.000	0.534	0.533	0.998838	6.99	0.5591
6	105.000	0.546	0.547	0.998953	7.11	0.5568
7	123.500	0.556	0.557	0.999313	7.20	0.5378
8	139.000	0.566	0.565	0.998135	7.30	0.5494
9	160.000	0.576	0.576	0.997266	7.39	0.5772
10	180.000	0.586	0.588	0.995637	7.49	0.5706
11	193.000	0.596	0.595	0.995650	7.59	0.5798
12	207.500	0.606	0.604	0.996488	7.69	0.5956
13	228.500	0.615	0.617	0.996635	7.78	0.5978
14	242.000	0.625	0.624	0.997435	7.88	0.6068
15	260.000	0.635	0.635	0.998509	7.98	0.6439
16	276.000	0.645	0.646	0.998782	8.08	0.6847
17	288.000	0.655	0.654	0.999185	8.19	0.6996
18	302.500	0.665	0.665	0.998710	8.29	0.7107
19	315.000	0.674	0.674	0.998548	8.39	0.7227
20	332.000	0.687	0.686	0.996302	8.53	0.7645
21	345.000	0.694	0.695	0.991746	8.61	0.9086
22	356.000	0.704	0.706	0.991750	8.72	1.1473
23	364.500	0.714	0.715	0.999254	8.83	1.4292
24	370.200	0.724	0.724	0.999152	8.94	1.6063
25	375.200	0.733	0.732	0.999194	9.05	1.7388
26	381.100	0.743	0.744	0.999844	9.17	1.8561
27	386.100	0.753	0.753	0.998777	9.29	1.8313
28	391.200	0.763	0.762	0.997820	9.41	1.8736
29	396.400	0.773	0.772	0.996154	9.53	1.9627
30	403.100	0.783	0.785	0.996514	9.66	2.1874
31	406.800	0.793	0.793	0.996874	9.78	2.5368
32	410.300	0.802	0.802	0.998627	9.90	2.9536
33	414.000	0.812	0.814	0.997744	10.03	3.2553
34	416.300	0.822	0.822	0.996421	10.17	3.2947
35	418.900	0.832	0.831	0.997403	10.30	3.4638
36	422.100	0.842	0.842	0.997233	10.44	3.6090
37	425.300	0.852	0.853	0.998724	10.59	3.7395
38	427.400	0.861	0.861	0.999650	10.72	3.9395
39	429.800	0.871	0.871	0.999653	10.87	4.2544
40	432.200	0.881	0.881	0.999789	11.02	4.5834
41	434.300	0.891	0.891	0.999952	11.17	4.8482
42	436.300	0.901	0.901	0.999948	11.33	5.2025
43	438.200	0.911	0.911	0.999468	11.49	5.7212
44	439.800	0.920	0.920	0.998939	11.64	5.9448
45	441.400	0.930	0.930	0.998687	11.81	6.1333
46	442.700	0.940	0.939	0.998523	11.98	6.4193
47	444.500	0.950	0.950	0.997899	12.15	6.8238
48	446.100	0.960	0.961	0.998139	12.33	7.1131
49	447.300	0.970	0.970	0.998750	12.52	7.3702
50	448.500	0.980	0.979	0.997815	12.71	8.0853
51	449.800	0.989	0.990	0.997027	12.88	8.9576
52	451.000	0.999	1.000	0.998407	13.08	9.8747
53	451.800	1.009	1.008	0.999058	13.28	10.7882
54	452.690	1.019	1.019	0.999171	13.49	11.7959
55	453.590	1.029	1.030	0.999446	13.71	12.6350
56	454.280	1.039	1.038	0.999715	13.93	13.2665
57	454.980	1.048	1.048	0.999519	14.13	14.3131
58	455.690	1.058	1.058	0.999478	14.36	15.2298
59	456.320	1.068	1.068	0.999054	14.60	15.5844
60	456.870	1.078	1.077	0.998239	14.85	16.6698
61	457.500	1.088	1.088	0.997762	15.10	17.9220
62	458.160	1.098	1.100	0.998096	15.36	19.4164
63	458.550	1.108	1.107	0.998411	15.62	21.2537
64	458.980	1.117	1.116	0.998196	15.87	23.8758
65	459.450	1.127	1.128	0.996503	16.16	28.2917
66	459.800	1.138	1.138	0.997195	16.48	34.8361
67	460.080	1.147	1.148	0.998777	16.75	41.0339
68	460.305	1.157	1.158	0.998538	17.06	47.7907
69	460.472	1.167	1.166	0.998480	17.38	52.2365
70	460.670	1.176	1.177	0.998832	17.67	57.1098
71	460.779	1.184	1.183	0.998749	17.95	59.2517
72	460.922	1.192	1.191	0.988915	18.23	70.9498
73	461.046	1.200	1.202	0.972480	18.51	68.5973
74	461.171	1.208	1.211	0.968936	18.80	65.2239
75	461.273	1.224	1.216	0.938898	19.42	74.5980
76	461.473	1.229	1.230	0.949293	19.58	115.3348
77	461.557	1.232	1.237	0.959825	19.74	162.2282
78	461.663	1.255	1.255	0.983315	20.70	239.8039
79	461.803	1.287				
80	461.828	1.310				
81	461.828	1.310				

*-data violates specimen size requirements

Paris exponent 5.315

log of intercept -10.907

Paris coefficient 1.239*10^-11.000


(MPa √m)
10
100
A357-T6, 37CG1
10^{-4}
10^{-5}
10^{-6}
10^{-7}
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 89CG1

Pmax = 500 LBF Pmin = 50 LBF P = 0.100

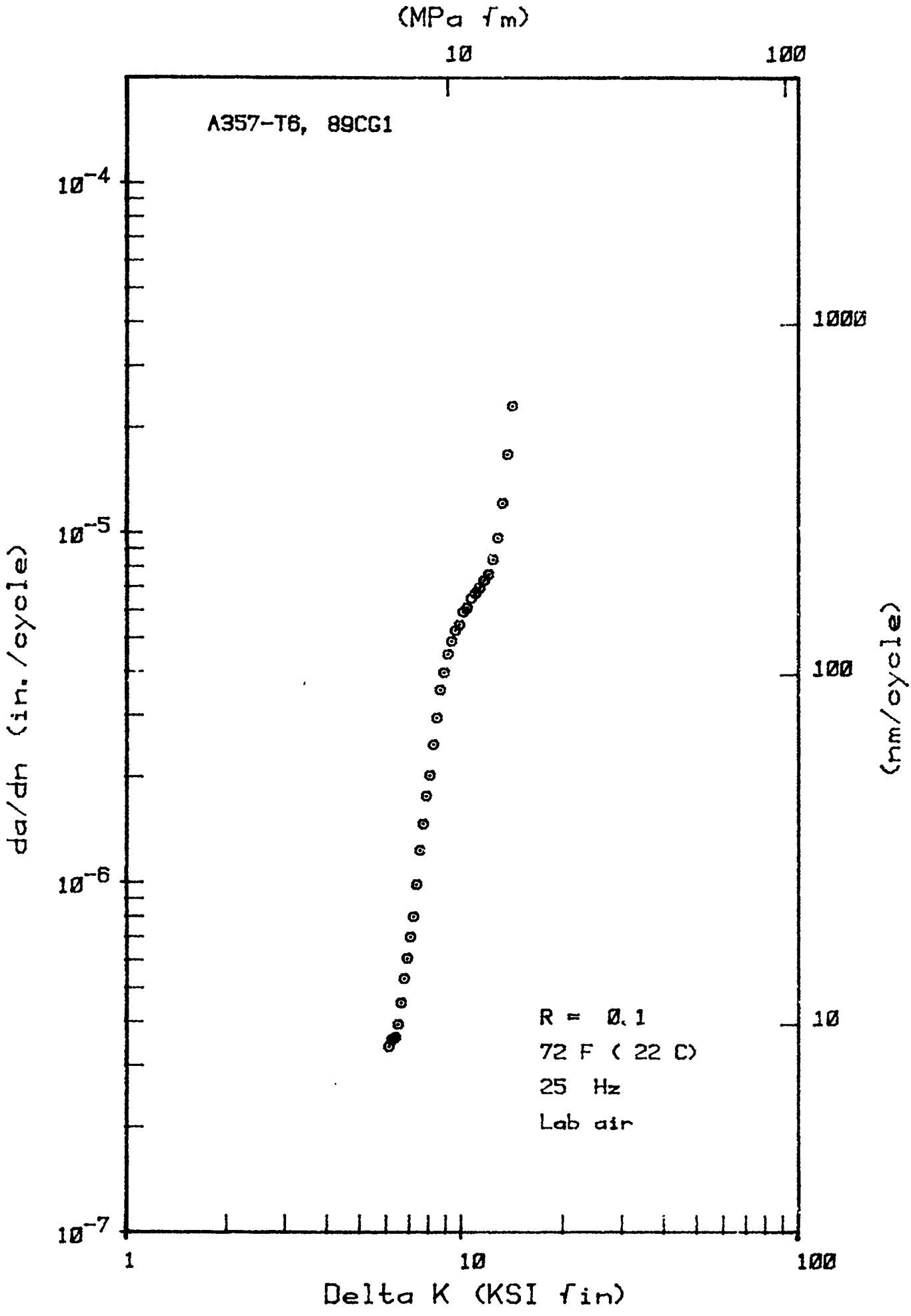
R=0.372 in. h=2.004 in. Crack Correction =0.000 in

Obs. #	Cycle Count	a-measured
1.000	0.001	0.743
2.000	61.910	0.759
3.000	105.360	0.774
4.000	144.200	0.789
5.000	180.900	0.805
6.000	226.080	0.820
7.000	282.930	0.835
8.000	320.000	0.851
9.000	348.000	0.866
10.000	378.580	0.881
11.000	406.040	0.897
12.000	420.830	0.912
13.000	444.000	0.927
14.000	458.820	0.943
15.000	470.400	0.958
16.000	480.690	0.973
17.000	488.000	0.989
18.000	496.660	1.004
19.000	502.150	1.020
20.000	507.730	1.035
21.000	511.340	1.050
22.000	515.000	1.066
23.000	518.380	1.081
24.000	521.370	1.096
25.000	524.030	1.112
26.000	526.930	1.127
27.000	529.230	1.142
28.000	532.220	1.158
29.000	533.790	1.173
30.000	536.530	1.188
31.000	538.460	1.204
32.000	540.570	1.219
33.000	542.700	1.234
34.000	544.000	1.250
35.000	546.150	1.265
36.000	547.580	1.281
37.000	548.400	1.296
38.000	549.070	1.311
39.000	549.530	1.327
40.000	549.860	1.342
34.000	546.490	1.250

PT #	CYCLE COUNT	A-cor in	A-req in	MC	deltaK KSI√in	da/dn in/cy
1	0.001	0.743				
2	61.910	0.759				
3	105.360	0.774				
4	144.300	0.789	0.789	0.994413	6.12	0.3407
5	180.900	0.805	0.803	0.997362	6.25	0.3569
6	226.080	0.820	0.818	0.993845	6.37	0.3616
7	282.930	0.835	0.838	0.993994	6.50	0.3941
8	320.000	0.851	0.852	0.998046	6.64	0.4541
9	348.000	0.866	0.864	0.998678	6.78	0.5329
10	378.580	0.881	0.882	0.998629	6.92	0.6086
11	404.040	0.897	0.898	0.998129	7.08	0.7007
12	420.830	0.912	0.910	0.997383	7.23	0.7998
13	444.000	0.927	0.929	0.996079	7.39	0.9884
14	458.820	0.943	0.944	0.995132	7.56	1.2358
15	470.400	0.958	0.958	0.999262	7.73	1.4719
16	480.690	0.973	0.974	0.998428	7.90	1.7707
17	488.000	0.989	0.987	0.998582	8.09	2.0274
18	496.660	1.004	1.006	0.997320	8.28	2.4853
19	502.150	1.020	1.020	0.996693	8.49	2.9600
20	507.730	1.035	1.037	0.999245	8.69	3.5565
21	511.340	1.050	1.050	0.999253	8.90	3.9841
22	515.000	1.066	1.065	0.999462	9.14	4.4969
23	518.380	1.081	1.082	0.999637	9.37	4.9036
24	521.370	1.096	1.097	0.999658	9.61	5.2614
25	524.030	1.112	1.111	0.999267	9.88	5.4606
26	526.930	1.127	1.127	0.998094	10.14	5.9427
27	529.230	1.142	1.142	0.997854	10.42	6.1124
28	532.220	1.158	1.160	0.997841	10.72	6.5090
29	533.790	1.173	1.171	0.997888	11.03	6.7332
30	536.530	1.188	1.189	0.997783	11.35	6.9748
31	538.460	1.204	1.203	0.997769	11.70	7.3088
32	540.570	1.219	1.218	0.999089	12.06	7.6123
33	542.700	1.234	1.235	0.998579	12.43	8.3972
34	544.490	1.250	1.250	0.997167	12.85	9.6971
35	546.150	1.265	1.266	0.994384	13.26	12.1840
36	547.580	1.281	1.284	0.989925	13.73	16.7973
37	548.400	1.296	1.298	0.991197	14.19	23.0923
38	549.070	1.311				
39	549.530	1.327				
40	549.860	1.342				

*-data violates specimen size requirements

Paris exponent	4.784	
log of intercept	-10.143	
Paris coefficient	7.187*10^	-11.000


(MPa √m)
10
100
A357-T6, 89CG1
10⁻⁴
10⁻⁵
10⁻⁶
10⁻⁷
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. #3CC1

σ_{max} = 500 PSI σ_{min} = 50 PSI λ = 0.100

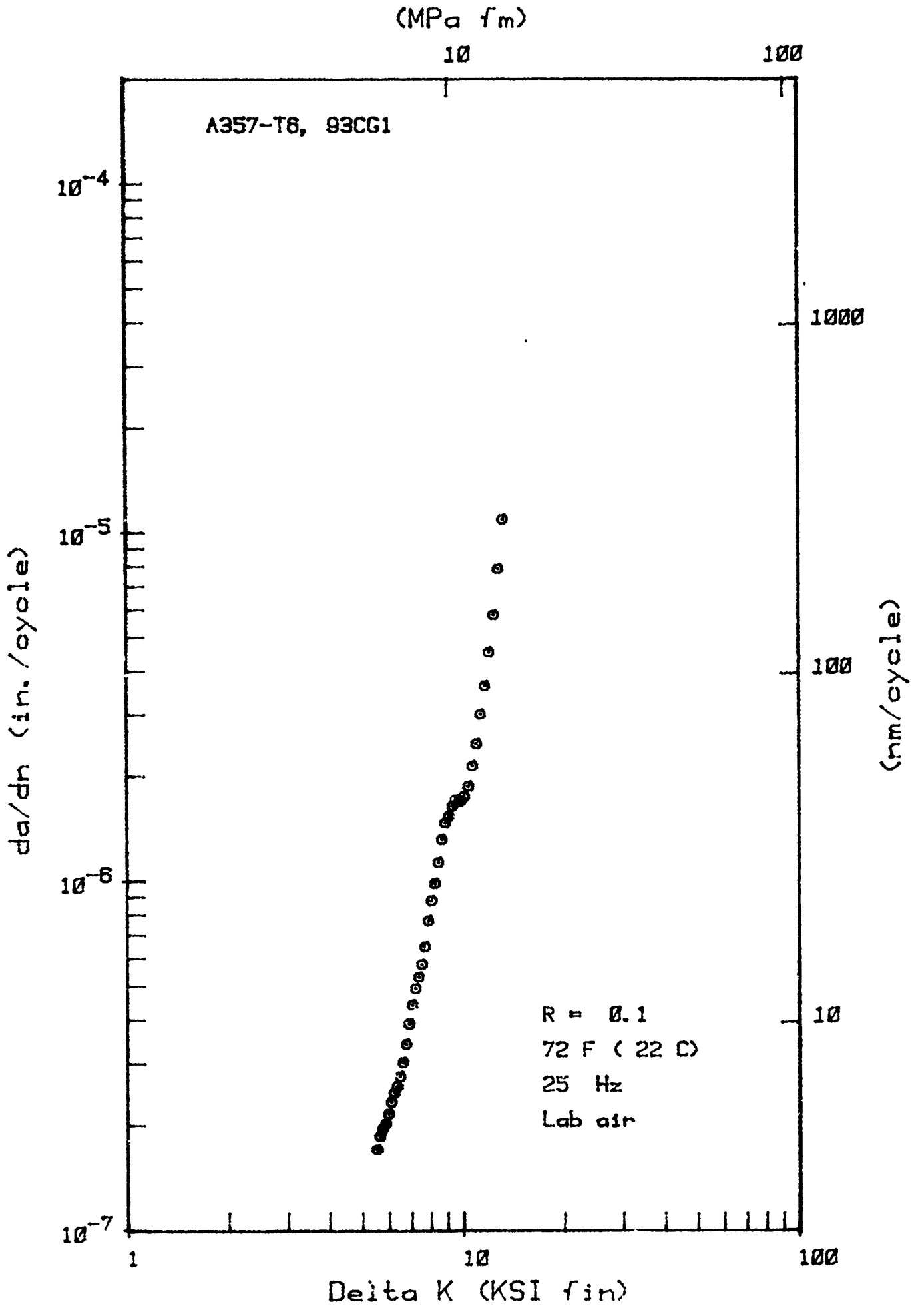
P=0.373 in. W=2.005 in. Crack Correction =0.001 in

Obs. #	Cycle Count	a-measured
1.000	0.001	0.666
2.000	343.150	0.691
3.000	459.820	0.696
4.000	541.900	0.712
5.000	626.540	0.727
6.000	696.460	0.742
7.000	760.960	0.758
8.000	857.810	0.773
9.000	930.500	0.788
10.000	995.870	0.804
11.000	1049.600	0.819
12.000	1104.760	0.834
13.000	1166.270	0.850
14.000	1221.670	0.865
15.000	1264.040	0.881
16.000	1298.950	0.896
17.000	1334.560	0.911
18.000	1364.680	0.927
19.000	1384.760	0.942
20.000	1416.580	0.957
21.000	1443.180	0.973
22.000	1462.160	0.988
23.000	1478.000	1.003
24.000	1491.530	1.019
25.000	1506.700	1.034
26.000	1518.710	1.049
27.000	1526.860	1.065
28.000	1536.060	1.080
29.000	1545.230	1.095
30.000	1554.980	1.111
31.000	1563.480	1.126
32.000	1572.030	1.142
33.000	1581.650	1.157
34.000	1588.460	1.172
35.000	1594.540	1.188
36.000	1599.320	1.203
37.000	1603.820	1.218
38.000	1607.030	1.234
39.000	1609.680	1.249
40.000	1611.770	1.264
41.000	1613.190	1.280
42.000	1613.920	1.295
43.000	1614.810	1.310

PT #	CYCLE COUNT	A-cor in	A-ave in	MC	delta K ksi√in	da/dn in/cy
1	0.001	0.666				
2	343.150	0.681				
3	459.820	0.696				
4	541.900	0.712	0.710	0.997399	5.50	0.1704
5	626.540	0.727	0.727	0.998707	5.63	0.1861
6	696.460	0.742	0.741	0.999602	5.74	0.1951
7	780.960	0.758	0.758	0.999507	5.86	0.2020
8	857.810	0.773	0.773	0.998929	5.97	0.2157
9	930.500	0.788	0.789	0.999707	6.09	0.2329
10	995.870	0.804	0.804	0.999541	6.22	0.2478
11	1049.800	0.819	0.819	0.999413	6.34	0.2583
12	1104.760	0.834	0.833	0.999014	6.47	0.2758
13	1166.270	0.850	0.850	0.997667	6.61	0.3025
14	1221.670	0.865	0.857	0.998646	6.75	0.3418
15	1264.040	0.881	0.883	0.999549	6.90	0.3900
16	1298.950	0.896	0.895	0.999657	7.04	0.4418
17	1334.560	0.911	0.912	0.999655	7.19	0.4929
18	1364.680	0.927	0.927	0.999644	7.36	0.5312
19	1389.760	0.942	0.941	0.999420	7.52	0.5771
20	1416.580	0.957	0.957	0.998254	7.69	0.6488
21	1443.180	0.973	0.974	0.997235	7.87	0.7699
22	1462.150	0.988	0.989	0.999119	8.05	0.8778
23	1478.700	1.003	1.003	0.999355	8.24	0.9832
24	1491.530	1.019	1.017	0.997679	8.44	1.1200
25	1506.700	1.034	1.035	0.997355	8.64	1.3146
26	1518.230	1.049	1.051	0.997908	8.85	1.4698
27	1526.860	1.065	1.064	0.997465	9.09	1.5399
28	1536.060	1.080	1.079	0.998760	9.32	1.6461
29	1545.230	1.095	1.095	0.999368	9.56	1.7125
30	1554.980	1.111	1.112	0.999673	9.82	1.6946
31	1563.480	1.126	1.126	0.999403	10.08	1.7475
32	1572.030	1.142	1.141	0.998109	10.37	1.8705
33	1581.650	1.157	1.159	0.996969	10.66	2.1402
34	1588.460	1.172	1.173	0.998204	10.96	2.4781
35	1594.540	1.188	1.188	0.999022	11.30	3.0077
36	1599.320	1.203	1.202	0.997926	11.63	3.6321
37	1603.820	1.219	1.220	0.997405	11.98	4.5316
38	1607.030	1.234	1.235	0.995739	12.38	5.7978
39	1609.680	1.249	1.251	0.990214	12.77	7.8644
40	1611.770	1.264	1.268	0.989477	13.18	10.9076
41	1613.190	1.280				
42	1613.920	1.295				
43	1614.810	1.310				

*-data violates specimen size requirements

Paris exponent	4.411	
log of intercept	-10.089	
Paris coefficient	8.142*10^	-11.000


(MPa √m)
10
100
A357-T6, 93CG1
10^-4
10^-5
10^-6
10^-7
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 97CC1

Pmax = 800 LBF Pmin = 80 LBF P = 0.100

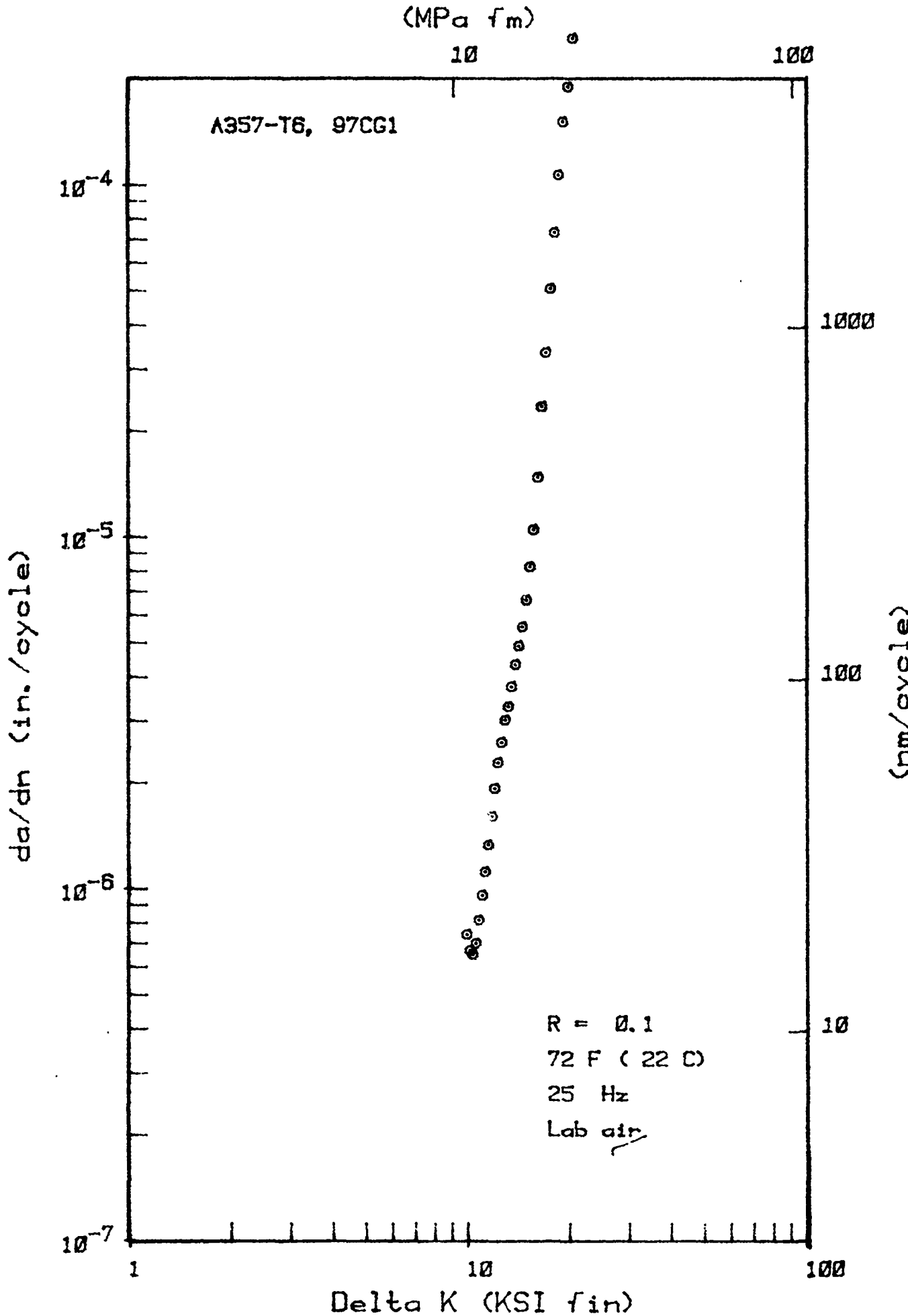
B=0.374 in. W=2.005 in. Crack Correction =0.000 in

Obs. #	Cycle Count	a-measured
1.000	0.001	0.744
2.000	77.450	0.759
3.000	94.960	0.775
4.000	111.730	0.790
5.000	130.540	0.805
6.000	156.700	0.821
7.000	181.730	0.836
8.000	206.570	0.851
9.000	230.100	0.867
10.000	248.310	0.882
11.000	263.240	0.897
12.000	276.840	0.913
13.000	288.030	0.928
14.000	297.860	0.943
15.000	305.450	0.959
16.000	311.310	0.974
17.000	317.620	0.990
18.000	322.190	1.005
19.000	326.560	1.020
20.000	330.640	1.036
21.000	334.640	1.051
22.000	337.000	0.000
23.000	1.066	1.066
24.000	342.580	1.097
25.000	344.030	1.112
26.000	345.520	1.128
27.000	346.890	1.143
28.000	347.270	1.158
29.000	347.730	1.174
30.000	348.040	1.189
31.000	348.250	1.204
32.000	348.400	1.220
33.000	348.470	1.236
34.000	348.560	1.252
35.000	348.630	1.267
36.000	348.670	1.283
37.000	348.690	1.299
38.000	348.710	1.316
39.000	348.730	1.366
22.000	337.000	1.066
23.000	339.680	1.082

PT #	CYCLE COUNT	Amplitude in	Average in			
1	77.450	0.759				
2	94.960	0.775				
3	111.230	0.790				
4	130.540	0.805	0.804	0.999036	9.94	0.7414
5	156.700	0.821	0.821	0.998033	10.15	0.6684
6	181.730	0.836	0.836	0.998314	10.35	0.6511
7	206.570	0.851	0.851	0.998536	10.57	0.7000
8	230.100	0.867	0.868	0.998524	10.80	0.8151
9	248.310	0.882	0.883	0.999276	11.02	0.9586
10	263.340	0.897	0.897	0.999761	11.26	1.1186
11	276.840	0.913	0.913	0.999022	11.51	1.3335
12	288.030	0.928	0.928	0.997963	11.76	1.6076
13	297.860	0.943	0.945	0.998709	12.02	1.9322
14	305.450	0.959	0.959	0.999526	12.30	2.2864
15	311.310	0.974	0.973	0.999781	12.58	2.6110
16	317.620	0.990	0.991	0.999638	12.88	3.0195
17	322.190	1.005	1.005	0.999719	13.18	3.2970
18	326.580	1.020	1.020	0.998681	13.49	3.7526
19	330.640	1.036	1.036	0.997788	13.84	4.3437
20	334.640	1.051	1.053	0.998359	14.17	4.9056
21	337.000	1.066	1.065	0.997190	14.53	5.5548
22	339.680	1.082	1.080	0.995218	14.92	6.6230
23	342.580	1.097	1.101	0.994487	15.30	8.2504
24	344.030	1.112	1.112	0.989193	15.70	10.5127
25	345.520	1.128	1.129	0.981111	16.15	14.8182
26	346.890	1.143	1.152	0.972202	16.59	23.5441
27	347.270	1.158	1.160	0.978560	17.04	33.5160
28	347.730	1.174	1.176	0.992884	17.56	50.7729
29	348.040	1.189	1.192	0.981136	18.07	73.3144
30	348.250	1.204	1.208	0.983910	18.60	106.7430
31	348.400	1.220	1.224	0.994137	19.20	151.1448
32	348.470	1.236	1.234	0.996134	19.83	189.9635
33	348.560	1.252	1.253	0.985855	20.50	261.2685
34	348.630	1.267	1.273	0.973950	21.16	392.4476
35	348.670	1.283				
36	348.690	1.299				
37	348.710	1.216				

*-data violates specimen size requirements

Paris exponent	8.516	
log of intercept	-14.930	
Paris coefficient	$1.175*10^{-15}$	-15.000


(MPa √m)
10
100
A357-T6, 97CG1
10^-4
10^-5
10^-6
10^-7
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 244/2-19

Pmax = 500 LBF Pmin = 50 LBF R = 0.100

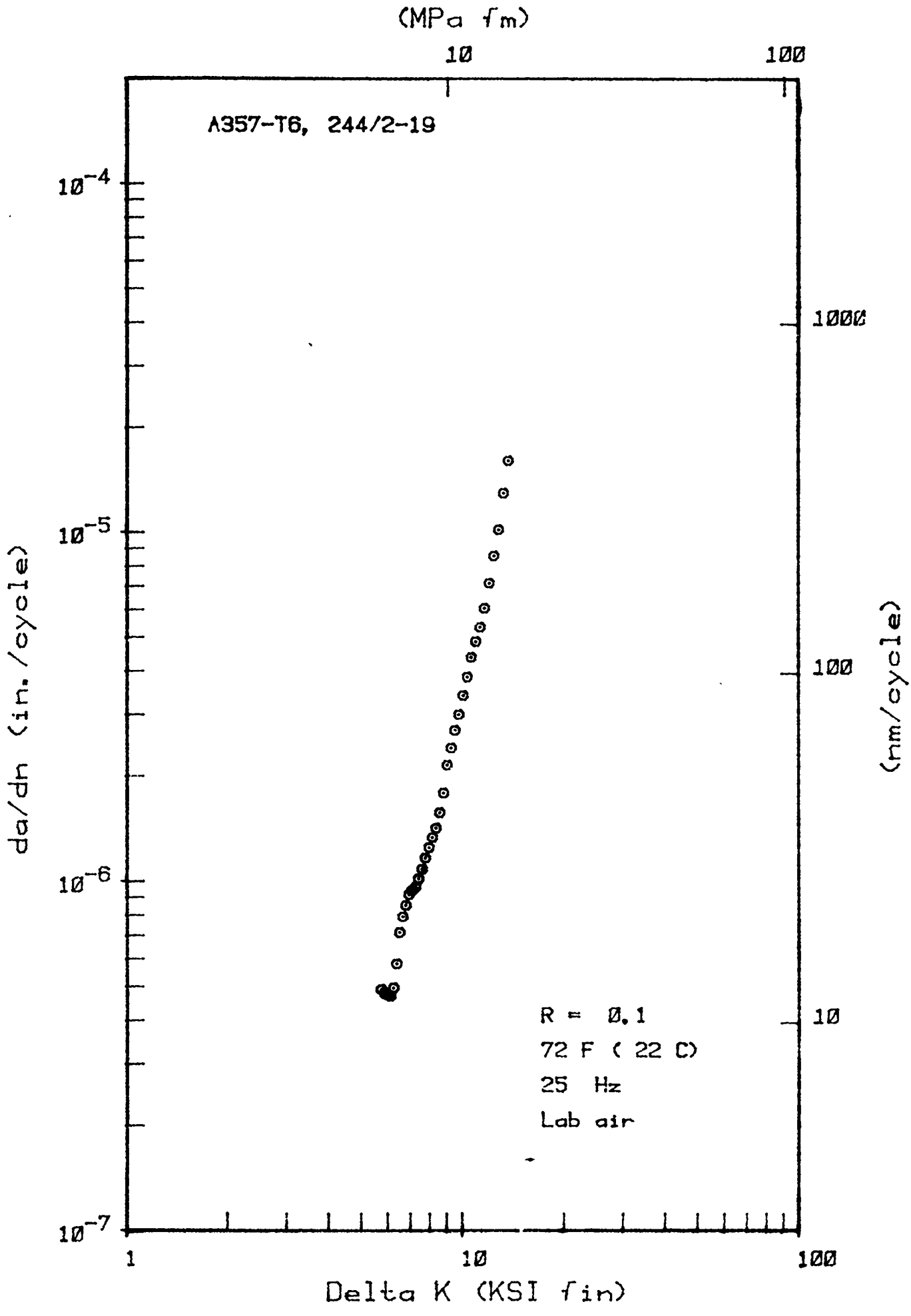
B=0.391 in. W=2.002 in. Crack Correction =0.000 in

Obs. #	Cycle Count	a-measured
1.000	0.001	0.735
2.000	28.310	0.751
3.000	60.260	0.766
4.000	93.570	0.781
5.000	121.770	0.797
6.000	150.900	0.812
7.000	188.620	0.827
8.000	223.480	0.843
9.000	254.670	0.858
10.000	284.880	0.873
11.000	303.670	0.889
12.000	319.050	0.904
13.000	335.640	0.919
14.000	354.310	0.935
15.000	369.180	0.950
16.000	385.260	0.965
17.000	400.180	0.981
18.000	414.910	0.996
19.000	427.690	1.012
20.000	439.200	1.027
21.000	450.060	1.042
22.000	461.280	1.058
23.000	470.690	1.073
24.000	480.310	1.088
25.000	486.520	1.104
26.000	492.570	1.119
27.000	497.320	1.134
28.000	503.230	1.150
29.000	507.480	1.165
30.000	511.150	1.180
31.000	514.760	1.196
32.000	517.650	1.211
33.000	520.130	1.226
34.000	523.180	1.242
35.000	525.260	1.257
36.000	526.790	1.272
37.000	528.500	1.288
38.000	529.540	1.303
39.000	530.600	1.319
40.000	531.230	1.334
41.000	531.790	1.349

PT #	CYCLE COUNT	A-cor in	A-req in	MC	delta K Stress	da/dn Equivalency
1	0.001	0.735				
2	28.310	0.751				
3	60.260	0.766				
4	93.570	0.781	0.783	0.998775	5.76	0.4909
5	121.770	0.797	0.796	0.998788	5.89	0.4776
6	150.900	0.812	0.810	0.998907	6.00	0.4749
7	188.430	0.827	0.826	0.998541	6.13	0.4696
8	224.480	0.843	0.843	0.996827	6.26	0.4963
9	254.670	0.858	0.858	0.995717	6.39	0.5815
10	284.880	0.873	0.876	0.996751	6.52	0.7146
11	302.670	0.889	0.889	0.997773	6.67	0.7927
12	319.050	0.904	0.902	0.997427	6.81	0.8543
13	335.640	0.919	0.919	0.999756	6.95	0.9175
14	354.310	0.935	0.936	0.999609	7.11	0.9445
15	369.180	0.950	0.950	0.999851	7.27	0.9645
16	385.260	0.965	0.965	0.999731	7.43	1.0172
17	400.180	0.981	0.981	0.999576	7.61	1.0858
18	414.910	0.996	0.997	0.999819	7.79	1.1680
19	427.690	1.012	1.012	0.999845	7.98	1.2524
20	439.200	1.027	1.027	0.999893	8.17	1.3389
21	450.060	1.042	1.042	0.999963	8.37	1.4218
22	461.280	1.058	1.058	0.998295	8.59	1.5760
23	470.690	1.073	1.073	0.997714	8.80	1.7907
24	480.310	1.088	1.090	0.997853	9.03	2.1539
25	486.520	1.104	1.104	0.998856	9.28	2.4087
26	492.570	1.119	1.119	0.998964	9.52	2.7061
27	497.320	1.134	1.133	0.999049	9.78	3.0031
28	503.230	1.150	1.151	0.998999	10.07	3.4040
29	507.480	1.165	1.166	0.999018	10.35	3.8489
30	511.150	1.180	1.180	0.999827	10.65	4.3828
31	514.760	1.196	1.197	0.999651	10.98	4.8648
32	517.650	1.211	1.211	0.999539	11.31	5.3486
33	520.130	1.226	1.225	0.997351	11.65	6.0612
34	523.180	1.242	1.244	0.997306	12.04	7.1488
35	525.260	1.257	1.259	0.997223	12.42	8.5681
36	526.790	1.273	1.272	0.998451	12.86	10.1838
37	528.500	1.288	1.290	0.995988	13.29	12.9695
38	529.540	1.303	1.304	0.994826	13.74	16.0965
39	530.600	1.319				
40	531.230	1.334				
41	531.790	1.349				

*-data violates specimen size requirements

Paris exponent	3.966	
log of intercept	-9.428	
Paris coefficient	$3.734*10^{-10}$	


(MPa √m)
10
100
A357-T6, 244/2-19
10^-4
10^-5
10^-6
10^-7
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 250/4-24

Pmax = 500 LBF Pmin = 50 LBF R = 0.100

B=0.393 in. W=1.997 in Crack Correction =0.000 in.

Obs. #	Cycle Count	a-measured
1.000	0.000	0.710
2.000	1[illegible]	[illegible]
3.000	2[illegible]	0.743
4.000	274.660	0.756
5.000	319.330	0.772
6.000	369.110	0.787
7.000	415.980	0.802
8.000	460.470	0.818
9.000	498.810	0.833
10.000	533.000	0.848
11.000	565.200	0.864
12.000	608.640	0.879
13.000	648.850	0.894
14.000	683.390	0.910
15.000	722.810	0.925
16.000	746.280	0.940
17.000	765.910	0.956
18.000	783.040	0.971
19.000	799.010	0.986
20.000	812.560	1.002
21.000	827.040	1.017
22.000	838.740	1.033
23.000	848.790	1.048
24.000	859.410	1.063
25.000	868.190	1.079
26.000	877.770	1.094
27.000	881.570	1.109
28.000	887.230	1.125
29.000	891.720	1.140
30.000	895.690	1.155
31.000	899.420	1.171
32.000	903.340	1.186
33.000	907.580	1.201
34.000	911.370	1.217
35.000	914.010	1.232
36.000	916.970	1.248
37.000	919.530	1.263
38.000	921.190	1.278
39.000	922.420	1.294
40.000	923.730	1.309
41.000	925.040	1.324
42.000	925.870	1.340

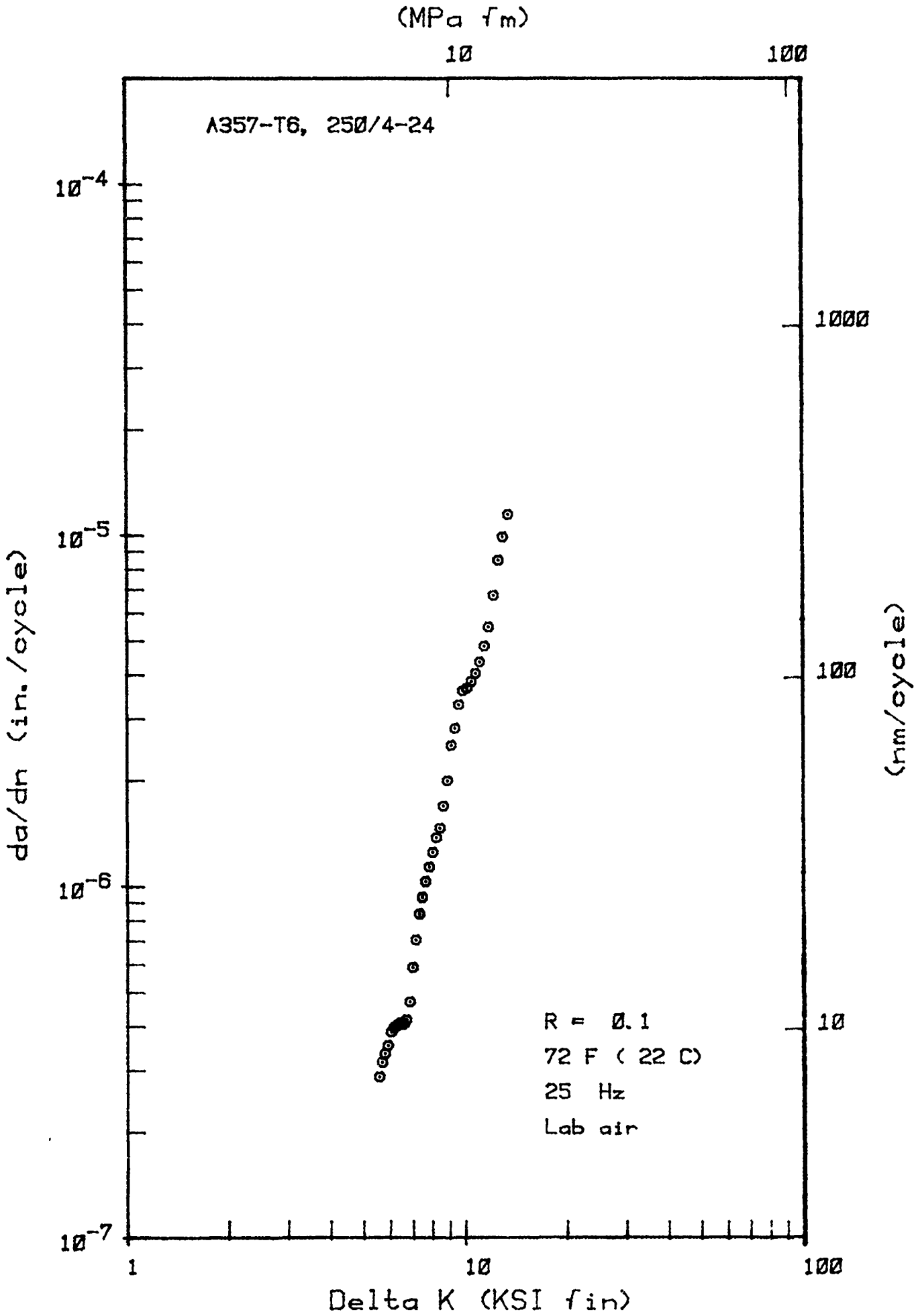
Pt #	Cycle Count	A-ccr in	Area in	PC	Delta K ksi√in	da/dn in/cy
1	0.001	0.710				
2	162.830	0.725				
3	227.630	0.741				
4	274.060	0.756	0.755	0.995110	5.58	0.2885
5	319.330	0.772	0.771	0.999128	5.69	0.3174
6	369.110	0.787	0.787	0.999373	5.81	0.3356
7	415.980	0.802	0.803	0.999195	5.94	0.3543
8	460.470	0.818	0.818	0.999802	6.05	0.3867
9	498.830	0.833	0.834	0.998227	6.17	0.3985
10	533.000	0.848	0.848	0.998060	6.30	0.4035
11	565.200	0.864	0.862	0.998517	6.44	0.4116
12	608.640	0.879	0.880	0.998542	6.57	0.4068
13	648.850	0.894	0.895	0.997169	6.71	0.4191
14	683.390	0.910	0.908	0.996057	6.87	0.4716
15	722.810	0.925	0.926	0.995147	7.02	0.5905
16	746.280	0.940	0.941	0.997236	7.17	0.7071
17	765.910	0.956	0.955	0.999733	7.34	0.8370
18	783.040	0.971	0.971	0.999717	7.51	0.9342
19	799.010	0.986	0.987	0.999617	7.68	1.0261
20	812.560	1.002	1.001	0.999467	7.87	1.1397
21	827.040	1.017	1.018	0.999519	8.06	1.2544
22	838.740	1.033	1.033	0.999356	8.26	1.3809
23	848.790	1.048	1.047	0.999451	8.46	1.4698
24	859.410	1.063	1.064	0.995491	8.67	1.6987
25	868.190	1.079	1.078	0.994076	8.91	2.0037
26	877.770	1.094	1.098	0.995715	9.14	2.5251
27	881.570	1.109	1.108	0.996988	9.38	2.8702
28	887.230	1.125	1.124	0.997666	9.65	3.2927
29	891.720	1.140	1.141	0.998698	9.91	3.6071
30	895.690	1.155	1.155	0.998655	10.19	3.6723
31	899.420	1.171	1.170	0.999355	10.50	3.8358
32	903.340	1.186	1.185	0.998231	10.80	4.0429
33	907.580	1.201	1.202	0.997820	11.12	4.3624
34	911.370	1.217	1.218	0.999314	11.49	4.8230
35	914.010	1.232	1.231	0.998929	11.84	5.4834
36	916.970	1.248	1.248	0.994832	12.24	6.7479
37	919.530	1.263	1.266	0.994905	12.64	8.5034
38	921.190	1.278	1.280	0.998070	13.06	9.9192
39	922.420	1.294	1.292	0.998038	13.53	11.4912
40	923.730	1.309				
41	925.040	1.324				
42	925.870	1.340				

*-data violates specimen size requirements

Paris exponent 4.287

log of intercept -9.797

Paris coefficient $1.595*10^{-10}$


(MPa √m)
10
100
A357-T6, 250/4-24
10^{-4}
10^{-5}
10^{-6}
10^{-7}
1000
100
10
da/dn (in./cycle)
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 251/4-31

Pmax = 500 LBF Pmin = 50 LBF R = 0.100

B=0.390 in. W=3.003 in. Crack Correction =0.000 in.

Obs. #	Cycle Count	a-measured
1.000	0.001	0.690
2.000	95.800	0.705
3.000	151.670	0.720
4.000	205.780	0.736
5.000	257.390	0.751
6.000	306.910	0.766
7.000	346.100	0.782
8.000	383.240	0.797
9.000	420.680	0.813
10.000	455.540	0.828
11.000	495.310	0.843
12.000	536.970	0.859
13.000	572.800	0.874
14.000	603.670	0.889
15.000	648.610	0.905
16.000	680.910	0.920
17.000	714.160	0.935
18.000	746.870	0.951
19.000	785.700	0.966
20.000	835.400	0.981
21.000	880.780	0.997
22.000	913.960	1.012
23.000	935.420	1.027
24.000	969.690	1.043
25.000	1005.980	1.058
26.000	1039.170	1.074
27.000	1060.410	1.089
28.000	1077.770	1.104
29.000	1099.240	1.120
30.000	1117.910	1.135
31.000	1131.910	1.150
32.000	1144.060	1.166
33.000	1153.560	1.181
34.000	1161.450	1.196
35.000	1168.950	1.212
36.000	1175.550	1.227
37.000	1181.220	1.242
38.000	1184.700	1.258
39.000	1188.080	1.273
40.000	1190.740	1.289
41.000	1193.040	1.304
42.000	1193.900	1.319
43.000	1194.550	1.335

PT #	CYCLE COUNT	A-corr in	A-req in	MC	deltaK KSI,in	da/cn uin/cy
1	0.001	0.690				
2	95.800	0.705				
3	151.670	0.720				
4	205.780	0.736	0.735	0.998799	5.45	0.2893
5	257.390	0.751	0.751	0.999204	5.56	0.3254
6	306.910	0.766	0.767	0.999443	5.67	0.3586
7	346.100	0.782	0.782	0.999624	5.79	0.3839
8	383.240	0.797	0.797	0.998864	5.90	0.3987
9	420.680	0.813	0.813	0.999781	6.03	0.4071
10	455.540	0.828	0.827	0.999771	6.15	0.4054
11	495.310	0.843	0.843	0.999161	6.27	0.4095
12	536.970	0.859	0.860	0.999117	6.41	0.4085
13	572.800	0.874	0.874	0.999161	6.55	0.4100
14	603.670	0.889	0.887	0.999172	6.68	0.4195
15	648.610	0.905	0.907	0.999347	6.83	0.4180
16	680.910	0.920	0.920	0.999464	6.98	0.4122
17	716.160	0.935	0.933	0.999311	7.13	0.4209
18	835.400	0.981	0.980	0.998284	7.62	0.4182
19	880.780	0.997	0.999	0.999279	7.82	0.4359
20	913.960	1.012	1.013	0.999405	8.00	0.4580
21	1005.980	1.058	1.057	0.998805	8.61	0.5700
22	1039.170	1.074	1.077	0.998533	8.84	0.6486
23	1060.410	1.089	1.090	0.998702	9.07	0.7050
24	1077.770	1.104	1.102	0.998775	9.30	0.7681
25	1099.240	1.120	1.120	0.997717	9.57	0.8861
26	1117.910	1.135	1.136	0.996802	9.82	1.0430
27	1131.910	1.150	1.151	0.998444	10.09	1.2556
28	1144.060	1.166	1.166	0.999582	10.40	1.5236
29	1153.560	1.181	1.181	0.999877	10.69	1.7700
30	1161.450	1.196	1.196	0.999951	11.01	2.0087
31	1168.950	1.212	1.212	0.997184	11.36	2.3981
32	1175.550	1.227	1.228	0.995817	11.70	2.9362
33	1181.220	1.242	1.245	0.996089	12.07	3.7568
34	1184.700	1.258	1.258	0.998773	12.43	4.5562
35	1188.080	1.273	1.274	0.993390	12.89	5.9357
36	1190.740	1.289	1.291	0.977946	13.35	8.2606
37	1193.040	1.304				
38	1193.900	1.319				
39	1194.550	1.335				

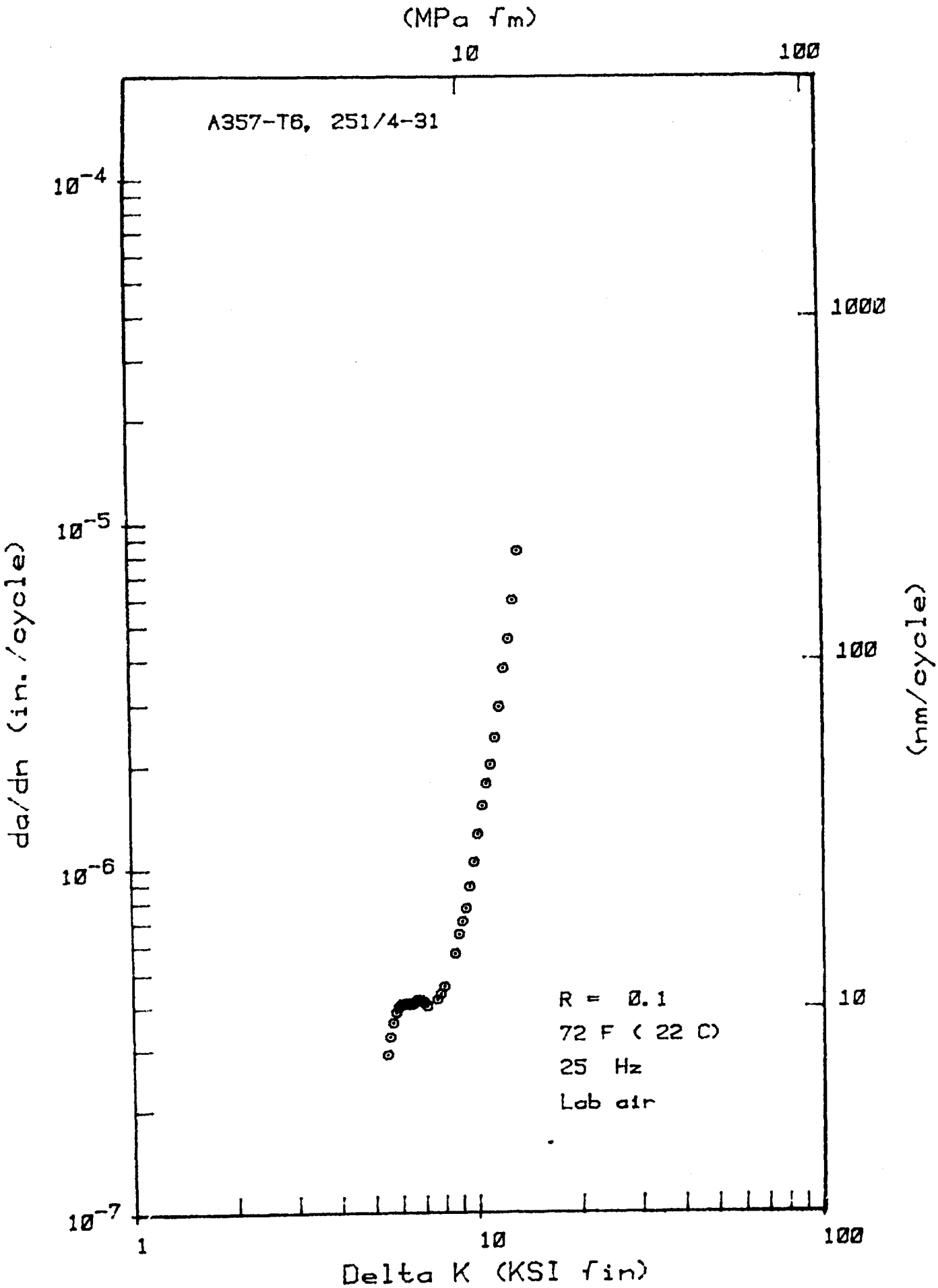
*-data violates specimen size requirements

Paris exponent 3.143

log of .intercept -8.967

Paris coefficient $1.078*10^{-9}$ -9.000

A357-T6, 251/4-31


(MPa √m)
10
100
A357-T6, 251/4-31
10^-4
10^-5
10^-6
10^-7
da/dn (in./cycle)
1000
100
10
(nm/cycle)
R = 0.1
72 F (22 C)
25 Hz
Lab air
1
10
100
Delta K (KSI √in)

SPECIMEN NO. 89CC1

Pmax = 700 LBF Pmin = 70 LBF P = 0.100

B=0.377 in. W=2.011 in Crack Correction =0.376 in.

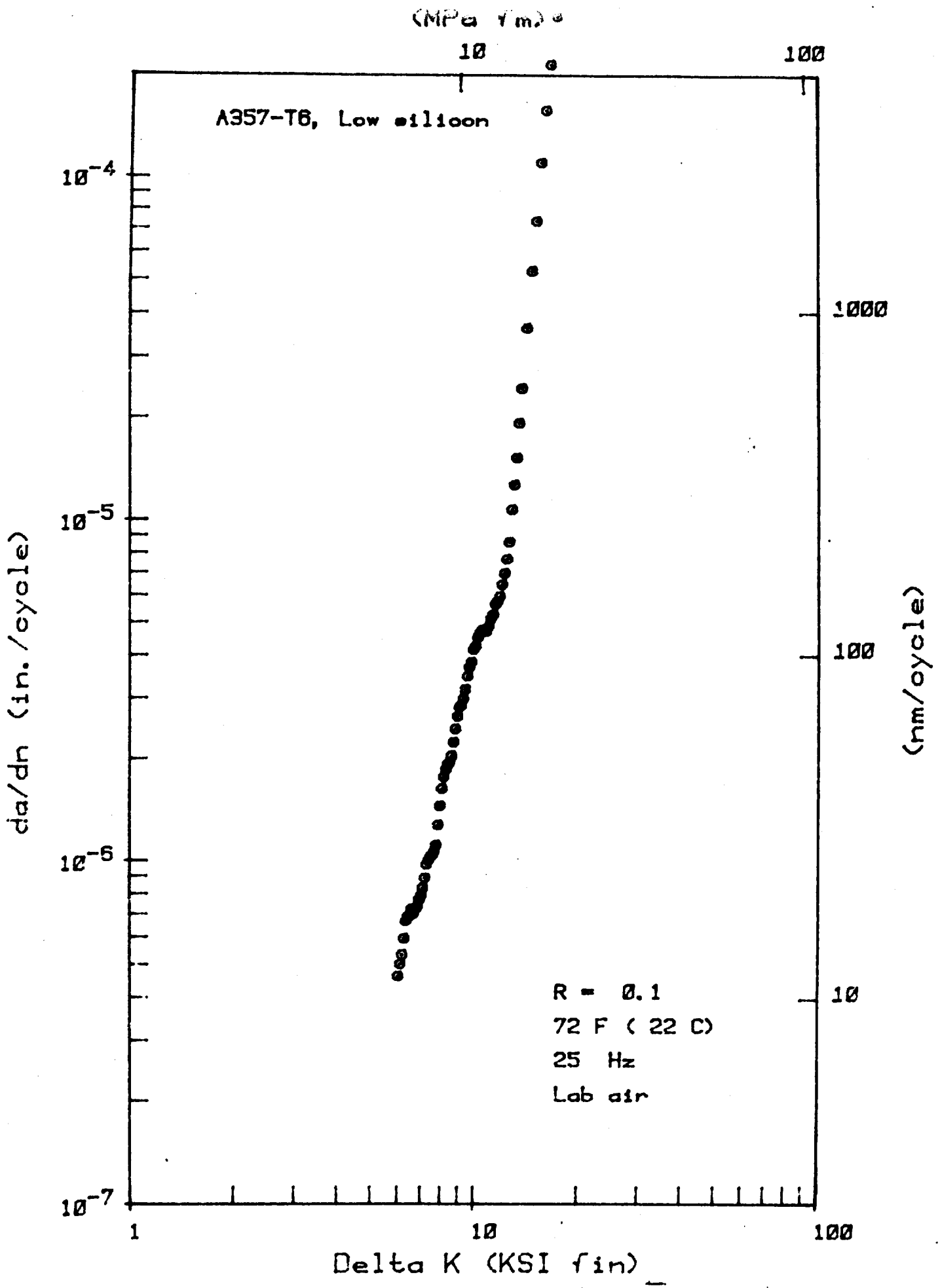
Obs. #	Cycle Count	a-measured
1.000	0.001	0.128
2.000	33.500	0.138
3.000	53.800	0.148
4.000	73.500	0.157
5.000	98.800	0.167
6.000	114.500	0.177
7.000	133.500	0.187
8.000	152.500	0.197
9.000	165.500	0.207
10.000	177.400	0.217
11.000	189.400	0.226
12.000	205.000	0.236
13.000	221.000	0.246
14.000	234.100	0.256
15.000	247.700	0.266
16.000	256.500	0.276
17.000	271.600	0.285
18.000	283.900	0.295
19.000	295.300	0.305
20.000	304.600	0.315
21.000	313.600	0.325
22.000	323.100	0.335
23.000	332.600	0.344
24.000	341.800	0.354
25.000	352.000	0.364
26.000	358.400	0.374
27.000	366.200	0.384
28.000	371.300	0.394
29.000	376.100	0.404
30.000	381.600	0.413
31.000	386.200	0.423
32.000	391.200	0.433
33.000	397.100	0.443
34.000	401.100	0.453
35.000	405.000	0.463
36.000	408.400	0.472
37.000	411.600	0.482
38.000	415.000	0.492
39.000	418.400	0.502
40.000	422.200	0.512
41.000	424.600	0.522
42.000	426.800	0.531
43.000	429.400	0.541
44.000	431.800	0.551
45.000	434.500	0.561
46.000	436.100	0.571
47.000	438.600	0.581
48.000	440.400	0.591
49.000	442.300	0.600
50.000	444.600	0.610
51.000	447.000	0.620
52.000	448.600	0.630
53.000	450.500	0.640
54.000	452.200	0.650
55.000	453.900	0.659
56.000	455.300	0.669
57.000	457.300	0.679
58.000	458.500	0.689
59.000	459.500	0.699
60.000	461.100	0.709
61.000	461.900	0.719
62.000	462.500	0.728
63.000	463.200	0.738
64.000	463.800	0.748
65.000	464.600	0.766
66.000	465.100	0.787
67.000	465.400	0.803
68.000	465.640	0.819
69.000	465.750	0.835
70.000	465.830	0.850
71.000	465.930	0.866
72.000	466.010	0.890
73.000	466.041	0.913
74.000	466.054	0.921
75.000	466.064	0.937
76.000	466.084	0.945
77.000	466.098	0.952
78.000	466.109	0.961
79.000	466.116	0.969
80.000	466.109	0.984

PT #	CYCLE COUNT	A-corr in	A-eq in	MC	delta K ksi√in	da/dN in/cy
1	0.001	0.504				
2	33.500	0.514				
3	53.800	0.524				
4	73.500	0.533	0.532	0.998158	6.04	0.4618
5	98.800	0.543	0.545	0.998280	6.12	0.5010
6	114.500	0.553	0.552	0.998295	6.20	0.5328
7	132.500	0.563	0.562	0.997645	6.29	0.5939
8	152.500	0.573	0.575	0.997541	6.37	0.6693
9	165.500	0.583	0.583	0.997142	6.45	0.6856
10	177.400	0.593	0.592	0.995653	6.54	0.6917
11	189.400	0.602	0.601	0.999083	6.61	0.7128
12	205.000	0.612	0.612	0.998612	6.70	0.7020
13	221.000	0.622	0.623	0.998971	6.78	0.7185
14	234.100	0.632	0.632	0.999171	6.87	0.7365
15	247.700	0.642	0.642	0.999134	6.96	0.7687
16	258.500	0.652	0.651	0.999448	7.05	0.7935
17	271.600	0.661	0.661	0.998822	7.13	0.8301
18	283.300	0.671	0.671	0.998528	7.22	0.8861
19	295.300	0.681	0.682	0.999808	7.32	0.9738
20	304.600	0.691	0.691	0.998087	7.41	1.0014
21	313.600	0.701	0.701	0.998216	7.50	1.0269
22	322.100	0.711	0.710	0.999358	7.60	1.0438
23	332.600	0.720	0.721	0.997256	7.69	1.0616
24	341.800	0.730	0.730	0.997808	7.79	1.1130
25	352.000	0.740	0.741	0.998481	7.89	1.2755
26	358.400	0.750	0.749	0.998085	7.99	1.4549
27	366.200	0.760	0.761	0.998292	8.10	1.6367
28	371.300	0.770	0.770	0.998446	8.20	1.7707
29	376.100	0.780	0.779	0.998353	8.31	1.8579
30	381.600	0.789	0.790	0.999232	8.41	1.9200
31	386.200	0.799	0.799	0.998687	8.52	1.9473
32	391.200	0.809	0.808	0.998318	8.63	2.0322
33	397.100	0.819	0.820	0.998081	8.74	2.2220
34	401.100	0.829	0.829	0.999198	8.86	2.4273
35	405.000	0.839	0.839	0.999454	8.98	2.6400
36	408.400	0.848	0.848	0.999807	9.09	2.8052
37	411.600	0.858	0.858	0.999338	9.21	2.8415
38	415.000	0.868	0.868	0.998640	9.34	2.9689
39	418.400	0.878	0.878	0.997558	9.47	3.1558
40	422.200	0.888	0.890	0.998434	9.60	3.4507
41	424.600	0.898	0.898	0.998843	9.73	3.6716
42	426.800	0.907	0.906	0.997938	9.86	3.7930
43	429.400	0.917	0.917	0.998122	10.00	4.1332
44	431.800	0.927	0.927	0.998410	10.14	4.2245
45	434.500	0.937	0.938	0.998481	10.28	4.4886
46	436.100	0.947	0.946	0.998376	10.43	4.6229
47	438.600	0.957	0.958	0.997843	10.59	4.7166
48	440.400	0.967	0.967	0.998721	10.74	4.7201
49	442.300	0.976	0.975	0.998094	10.89	4.6698
50	444.600	0.986	0.986	0.997779	11.05	4.8338
51	447.000	0.996	0.997	0.999020	11.22	5.0705
52	448.600	1.006	1.005	0.998978	11.39	5.2365
53	450.500	1.016	1.016	0.998923	11.57	5.6159
54	452.200	1.026	1.026	0.999031	11.75	5.7391
55	453.900	1.035	1.036	0.998414	11.92	5.9282
56	455.300	1.045	1.044	0.996210	12.11	6.4224
57	457.300	1.055	1.057	0.996297	12.30	6.9281
58	458.500	1.065	1.065	0.995570	12.50	7.6174
59	459.500	1.075	1.073	0.994065	12.71	8.5508
60	461.100	1.085	1.088	0.992262	12.92	10.6485
61	461.900	1.095	1.096	0.995443	13.14	12.5593
62	462.500	1.104	1.102	0.998257	13.34	15.0830
63	463.200	1.114	1.114	0.994673	13.58	19.1228
64	463.800	1.124	1.125	0.994224	13.81	24.1102
65	464.600	1.144	1.146	0.995008	14.31	35.9388
66	465.100	1.163	1.165	0.990696	14.82	52.4844
67	465.400	1.179	1.183	0.982488	15.26	73.4169
68	465.640	1.195	1.202	0.986113	15.73	110.0132
69	465.750	1.211	1.213	0.991658	16.23	156.5153
70	465.830	1.226	1.225	0.984263	16.72	213.9434
71	465.930	1.242	1.247	0.981184	17.27	301.9248
72	466.010	1.266	1.275	0.974525	18.16	493.4425
73	466.041	1.289	1.290	0.987358	19.08	665.1669
74	466.054	1.297	1.298	0.982883	19.42	706.2158
75	466.064	1.313	1.308	0.987944	20.13	709.2557
76	466.084	1.321	1.322	0.979214	20.50	693.7691
77	466.098	1.329	1.335	0.845266	20.88	816.4773
78	466.109	1.337				
79	466.116	1.345				
80	466.109	1.360				

*-data violates specimen size requirements

Paris exponent 5.855

log of intercept -11.146



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